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Survey of Boston's Health Services Economy

Interim Report

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Abstract

Health care comprises a large and growing component of the national economy, representing eleven percent of Gross National Product (GNP) in 1986 and projected to amount to fifteen percent of GNP by the year 2000. The distribution of growth among health industries and occupations is being profoundly influenced by technological and financial changes. Hospitals occupy a central position in the health care economy as the greatest producer of services, provider of jobs, and source of technological advances. Hospitals are also involved in the greatest changes taking place within the health care sector, as demonstrated by recent national declines in patient occupancy rates. Outpatient clinics and Health Maintenance Organizations are assuming a growing share of hospitals' principal activity.

The Boston economy specializes in health care, with 68,000 jobs making up eleven percent of the city's total employment. Boston's health sector specializes in hospitals which account for seven percent of all jobs, more than twice the national average proportion. Preliminary findings of an in-depth survey indicate that Boston hospitals are well positioned to survive and prosper through the changes taking place within the industry. Their competitive advantage derives from their status as teaching affiliates of major medical schools, as highly reputed centers of specialty care, and as leaders in research. Medical research is the most rapidly expanding activity of Boston hospitals. Research currently accounts for an estimated 9 percent of hospital employment, and this could increase to 13 percent within five years. Research now occupies an estimated 1.5 million square feet of space at Boston hospitals and medical schools, with another 1.2 million square feet under construction, planned, or proposed. Greater understanding and cooperation between medical institutions and the public sector in the areas of development and employment planning could contribute to Boston hospitals' health care mission and to public economic benefits.

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PREFACE

Boston's renowned and much heralded health and medical institutions are important to the economy and life of the city. They provide services to the people of the city and the world. Their flow of jobs signifies expanding opportunity at all income levels and for workers of diverse races and ethnic origins. They add strength to the economic base of Boston neighborhoods. They lead the Nation in medical research.

This is the interim report of the Boston Redevelopment Authority Policy Development and Research Department's Medical Industry Survey Project. The project's principal objective is to collect and share information from Boston's major medical institutions to further our understanding of the city's health service economy, its future, and its needs for the future. Although the survey is still underway and only the most tentative conclusions can be drawn from it, the indications are clear that the role of health services in the local economy is great and unique, and that its future is bright but full of uncertainties.

This report draws from published sources of state and national data, and it benefits especially from the insights provided by Boston hospital administrators, health professionals, and others who serve or are served by Boston's health industries. The Boston Redevelopment Authority wishes to express appreciation to all who have made this survey report possible; to the medical institutions and medical schools and their staff for their interested, painstaking, time-consuming cooperation; to the Medical Area Services Corporation for its assistance and information; to the Health Council of Greater Boston; to John Marttila for facilitating an early reading of his report The Impact of Health Services and the Biotechnical/ Biomedical Industries on the Massachusetts Economy; to Thomas J. Andrews for making available his M.I.T. Master's thesis, Opportunities and Constraints in Developing Biomedical Research Space for Teaching Hospitals.

CHAPTER I: INTRODUCTION AND SUMMARY

The health services industry occupies a unique position in the national and Boston economies. Public and private health expenditures combined account for one ninth of Gross National Product. The private health sector alone provides nearly six percent of the nation's jobs. By the year 2000, over seven percent of all jobs will be in the private health field. In Boston this economic presence is nearly twice as great as it is nationally.

What makes the health services economy even more special are the reasons for its size and growth. As individuals we place great value on health services. We are willing to spend an increasing share of each extra dollar on health. As a society, we regard access to health care as a right for all, rather than as a consumer option for those with means to pay. We want minimum standards for all, and we measure our society's achievement by the level of those standards. These standards will face powerful pressures over the next three or four decades as large segments of our population (the baby boom generation) age and require more health services.

As an economy, we have created complex and unique mechanisms to determine how much health services we provide, how they are to be allocated, and how they are to be paid. Most health services are paid by "third parties" : insurance companies or government. Health service providers must compete for their share of the market, but the size of that market is determined largely through these third parties. When we pay our taxes or insurance premiums, we want the bill to be kept low; but when we require health services, we do not want to be constrained by costs. This last conflict between cost containment and access to quality care is one of the most important issues facing our society in general, and the health services industry, especially hospitals, in particular.

Technical advances in health sciences are shaping the future of the industry as well. New diagnosis and treatment discoveries are increasing industry output and reducing costs, but are also requiring new investments. Many of these initial investments are in "noncommercial research" funded largely by government or private foundations. This situation is analogous to the third party reimbursement system for personal health care in that there is competition among researchers for grant funds and laboratory and other facilities, but total funding is largely determined through a government process.

The national perspective

Health services continue to make gains as a share of the U.S. economy. Total expenditures for health services have grown from 5.9 percent of Gross National Product (GNP) in 1965 to 10.9 percent in 1986. The Federal Health Care Financing Administration projects that this will expand further to 15 percent of GNP by the year 2000. The dollar value of hospital services will continue to grow at a rate exceeding the total health services average, but by a smaller margin than over the preceding two decades.

Both scientific and financial developments have encouraged a shift from inpatient treatment to outpatient care, leaving hospitals to increase their specialization in areas of greater productivity and technical sophistication. One result of these trends is to shift the more labor-intensive aspects of health care to more efficient clinic and practitioners' settings. Of the four major components of the health services industry, all but hospitals are among the twenty industries with the most rapid projected employment growth rates. More than one out of seven new jobs created between 1986 and 2000 is expected to occur in the health services sector.

Employment growth in private health services industries continues to outpace the rest of the economy. Employment in these sectors has risen from 4.9 percent of all jobs in 1979 to 5.9 percent in 1986, and is projected to grow to 7.3 percent by the year 2000. Medical occupations, found largely but not entirely within health service industries, have some of the brightest growth prospects to the year 2000. Twelve of the twenty occupations with the most rapid predicted growth rates are medical, led by medical assistants, physical therapists, and therapy assistants. Registered nurses, licensed practical nurses, and nursing aides are among the top twenty occupations for projected growth in the number of jobs, comprising six percent of the total projected job growth for the entire economy.

The health service economy has strong links to other industries with exceptional growth prospects. These include the manufacture of X-ray and related apparatus, and of optical and opthalmic products, each with anticipated output growth exceeding 5 percent annually to the year 2000. The drugs industry and the medical instruments and supplies industry also expect annual growth in output of at least 4 percent.

The special role of health services and hospitals in Boston

Private health services' share of total employment in Boston is nearly twice the national average. Not only does Boston specialize in health services, but our health services specialize in hospitals. Eleven percent of all Boston jobs are in private health services, and seven percent of all jobs are in hospitals, both public and private.

Health services are a major export industry for Massachusetts. Boston is the center for medical activities, such as research and specialty hospital care, that serve the nation and world, and bring money into the city and

region. Preliminary indications from the Medical Industry Survey being conducted by the Policy Development and Research Department of the Boston Redevelopment Authority point to exceptional performance and achievement by Boston's hospitals. They are not only leaders in research and in the development of new technologies; they also remain in the forefront of patient care and utilization. The initial sample of 15 hospitals responding to the survey has achieved, on average, a slight increase in patient admissions over the past five years. Although the average inpatient length of stay in these hospitals fell by more than one half over this period, overall occupancy rates averaged 76 percent last year. The Massachusetts Rate Setting Commission recently reported a 1986 state average occupancy rate of only 65.6 percent (The Boston Globe, November 1, 1987).

Boston hospitals also appear exceptional in their prospects for providing jobs in a variety of occupations and across a wide range of education and salary levels. The initial sample of participating hospitals reports anticipated personnel needs that would translate into 7,651 new jobs over the next five years if applied across all hospitals in the city. The wage levels and occupational mix reported by these hospitals imply a total 1987 payroll of over $1 billion for all Boston hospitals, with prospects for an additional $184 million (at current wage rates) in five years. Current major personnel shortages exist for nurses, technicians, and non-medical support staff.

Biomedical research in Boston

The research role of Boston hospitals is extremely healthy and has an excellent prognosis for future growth. This strength stems from the linkages among medical and educational institutions, and the resulting "critical mass" of reputation and talent.

Nationally, non-commercial research expenditures have risen from $7.3 billion in 1980 to $8.2 billion in 1986, all in 1986 constant dollars, and is projected to increase through the year 2000. Research funding is largely determined through government appropriation, which is responsible for 95 percent of all non-commercial biomedical research funding in the U.S.

Massachusetts receives the highest per capita amount of National Institute of Health (NIH) monies. In 1985, the state received a total of $382.5 million, or 11 percent of all NIH monies; of this Boston received $268.5 million. This made Boston the nation's leading recipient on a per capita basis and second only to New York City in total research grants. In fact, out of the top 11 U.S. hospitals receiving the most NIH funding in 1985, nine were Boston hospitals. There are 17 Boston hospitals and medical schools currently performing research and they occupy an estimated 1.5 million square feet (s.f.) of research space. The average full time research worker requires an estimated 395 s.f., but many researchers are severely overcrowded due to a shortage of suitable space. The total research work force for the hospitals and medical schools in Boston is estimated at 4,446 full time equivalent jobs.

The hospitals and medical schools have 310,000 s.f. now under construction and an additional 904,500 s.f. in the planning and proposal stages. At present utilization rates this total of 1.2 million s.f. will accommodate an estimated 3075 new jobs, a 70 percent increase over the current level. Over half of this space, enough to accommodate 1,665 jobs, is linked to the Longwood Medical Area. The West End institutions will demand a total of 373,000 square feet of space. The South Cove institutions will require space that might accommodate over 400 new jobs.

Half of the new jobs -about 1470 or 48 percent- will require a college degree. The top paying jobs will require an advanced degree; these account for

23 percent or 717 of the anticipated new research positions. Twenty-nine percent or 889 of the new research positions will not require a college degree.

Ten of the surveyed institutions were asked if they would consider an off-campus research facility at one or more of four sites; five respondents mentioned the Charlestown Navy Yard, five said they would consider the Fenway's Sears Building, four of the institutions responded favorably to the Parcel 18 site, and three were interested in the South End Technology Square site.

The leasing of space at these sites may be advantageous to both the hospitals and the City of Boston. The hospitals can avoid additional debt which can jeopardize their bond ratings by leasing and can be totally reimbursed for lease payments whereas, interest for an owned facility is not reimbursable without a difficult to obtain waiver. The City receives tax revenues from the leased space whereas, a hospital owned and occupied facility is tax exempt. These revenues help pay for public services provided such as snow removal, police and fire protection, and a host of others which are not usually recovered from tax exempt properties such as the hospitals.

Insights from Boston hospitals

Interviews with Boston hospital executives provide insights into the major issues of concern to their institutions, the advantages and disadvantages of being in Boston, and some opportunities for public-private cooperation.

Hospital administrators are concerned about recent and dramatic changes in their operating environments which they fear are threatening their institutions' profitability and viability. Proposed changes in the health care financing system are their most immediate concern, followed by staffing shortages in key areas such as nursing, and a pressing need for additional space for expan-

sion. More space for parking is needed by most hospitals, expecially those in congested areas of the city.

The advantages of being in the city of Boston "where the action is" outweigh the disadvantages of lack of space, a tight labor market and the high cost of housing, among other problems cited.

Administrators at most institutions surveyed responded positively to increased public sector involvement in areas of concern to the hospitals. Specific suggestions focussed on easing the present complicated regulatory process in Massachusetts and re-examining the health care payment system. In addition, finding more space for expansion and parking is perceived as a need that hospitals and the public sector can work on together.

Finally, several administrators expressed a concern that the city undervalued the important contributions of health care institutions to Boston's economy, especially in terms of jobs provided and monies spent.

CHAPTER II: HEALTH SERVICES IN THE NATIONAL ECONOMY

National expenditures for all health goods and services have grown from $694 per capita in 1965 to $1,837, in 1986. By the year 2000 this is projected to reach $3,248 per capita, measured in 1986 constant dollars. This represents not only more money, even after accounting for inflation, but also a greater share of our economy. Between 1965 and 1986 total health expenditures rose from 5.9 percent of the Gross National Product to 10.9 percent. By the year 2000, this share is expected to grow to 15 percent. See Table I. These figures represent total expenditures, including those provided outside of the private health industry sector. They include public hospitals and clinics, the health activities of schools and private companies, and government grants for research. They include direct patient payments and third party payments through private insurance, Medicare, and Medicaid. Three quarters of national health expenditures were channeled through third parties in 1986.

Although Table I presents expenditures after adjustment for general inflation, these figures still contain an element of cost inflation particular to health goods and services. Between 1985 and 1986, medical care prices rose 7.7 percent while the aggregate consumer price index (CPI) rose only 1.9 percent. This gap in inflation rates narrows considerably, however, if we remove steeply falling gasoline and energy prices from the aggregate CPI, further narrow our focus to comparisons with service prices (health care is largely a collection of services, rather than goods), and exclude the conceptual price of health insurance from medical prices. The comparison then would be between 6.2 percent price inflation for health care and 5.0 percent for all service industries.

Table I also shows that hospital expenditures have grown more rapidly than total health expenditures, 1965-1986, rising from 33 percent of total expen-

TABLE I

NATIONAL HEALTH EXPENDITURES AND SELECTED COMPONENTS
(1986 constant dollars)

	HOSPITAL ($billions)	NONCOMMERCIAL RESEARCH ($billions)	TOTAL ($billions)	TOTAL PER CAPITA	TOTAL % GNP
1965	$47.4	$5.1	$141.9	$694.1	5.9
1986	$179.6	$8.2	$458.2	$1,837.0	10.9
2000	$363.5	$11.8	$895.1	$3,248.0	15.0
annual % change: 1965-1986	6.5%	2.3%	5.7%	4.7%	3.0%
annual % change: 1986-2000	5.2%	2.6%	4.9%	4.2%	2.3%

SOURCE: Health Care Financing Administration, Office of the Actuary, "National Health Expenditures, 1986-2000" appearing in HEALTH CARE FINANCING REVIEW/Summer 1987.
NOTE: All expenditures have been adjusted to constant dollars at 1986 prices using the U.S. G.N.P. deflator. H.C.F.A. projections had assumed 3.9% average annual inflation.

ditures to 39 percent over that period. Further growth to the year 2000 is expected to see hospital expenditures increasing only slightly faster than average, rising to 40 percent of all health spending.

Noncommercial research consists largely of government grants to doctors and scientists working in hospitals, universities, medical schools, and non-profit research institutes. It has not grown as rapidly as total expenditures, but its growth rate is projected to increase in the future, both in absolute terms, and in comparison to the rate of total spending increase.

Employment within private health service industries (Table II) represents that part of the health care economy found in non-government businesses and institutions that specialize in health services. These industries contain all types of jobs, but of course they have a concentration of health occupation jobs. Total employment in health service industries grew between 1972 and 1979 at more than twice the rate of total U.S. job growth. Between 1979 and 1986, health service industry job growth slowed somewhat, but not as much as the rest of the economy, so that health sector employment grew at nearly triple the national average rate. The U.S. Department of Labor's projections for further employment growth to the year 2000 anticipate that private health service jobs will continue to grow at more than double the economy-wide average. As a result, health services jobs have risen from 4.0 percent of total jobs (including all government) in 1972 to 5.9 percent in 1986, and they will account for 7.3 percent of all jobs by the year 2000.

Each of the four health service industries shown on Table II is among the nation's twenty industries projected to generate the largest numbers of new wage and salary jobs by year 2000. Of these four, all but hospitals are among the top twenty for expected rate of growth.

TABLE II

EMPLOYMENT IN PRIVATE HEALTH SERVICE INDUSTRIES, 1972, 1979, 1986, AND PROJECTED TO 2000

SIC Code	Industry	Employment (1000)				Annual Growth Rate (%)		
		1972	1979	1986	2000 *	1972-1979	1979-1986	1986-2000 *
801-804	Offices of health practitioners	694	1,150	1,672	3,061	7.5	5.5	4.4
805	Nursing & personal care facilities	591	951	1,250	2,097	7.0	4.0	3.8
806	Hospitals, private	1,980	2,608	3,038	3,513	4.0	2.2	1.0
807-808	Outpatient facilities and miscellaneous health services	146	284	591	1,103	10.0	11.0	4.6
80	Total health services	3,412	4,993	6,551	9,774	5.6	4.0	2.9
	Total U.S. Employment	84,549	101,353	111,623	133,030	2.6	1.4	1.3
	Health services as a percent of total U.S. Employment	4.0	4.9	5.9	7.3			
	Hospitals as a percent of health services	58.0	52.2	46.4	35.9			

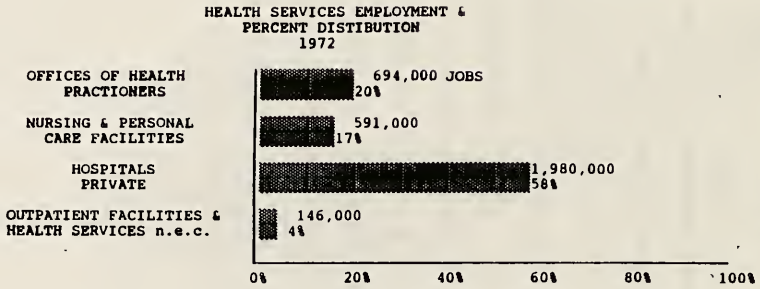
*(projected)

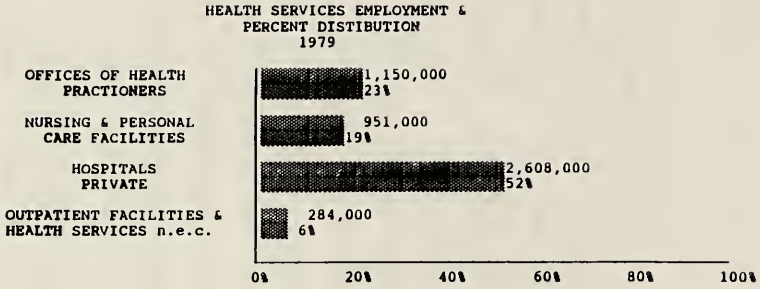
Source: U.S. Department Of Labor, Bureau Of Labor Statistics, "Industry output and employment through the end of the century" MONTHLY LABOR REVIEW, Sept. 1987, vol.10, Number 9

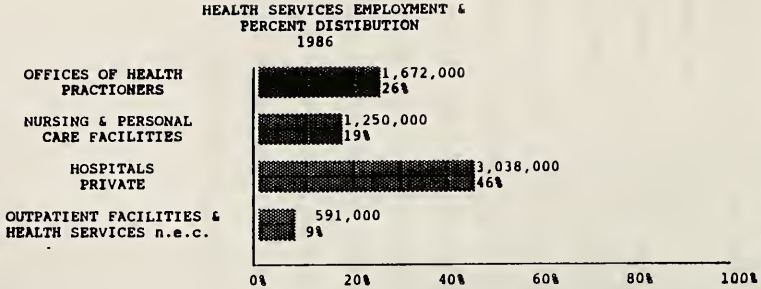
Hospitals have been the slowest growing job source of major health service sectors as a consequence of cost containment measures and structural change, but they still outpaced the overall economy through 1986. The average hospital job growth rate through the year 2000 is expected to fall below the national economy average, to less than one fourth of the rates projected for the smaller but rapidly growing outpatient and related facilities sector, and the offices of health practitioners category. Hospital employment's share of private health service jobs has declined from 58 percent in 1972 to 46.4 percent in 1986. By the year 2000 hospitals could employ less than 36 percent of total private health service workers. This change in employment/industry mix within the health sector is shown on Chart I. The technical and financial trends toward increasing reliance on outpatient testing and treatment is shifting more health care services to doctor's offices and outpatient clinics. A growing number of these offices and clinics are doing business as Health Maintenance Organizations (HMOs).

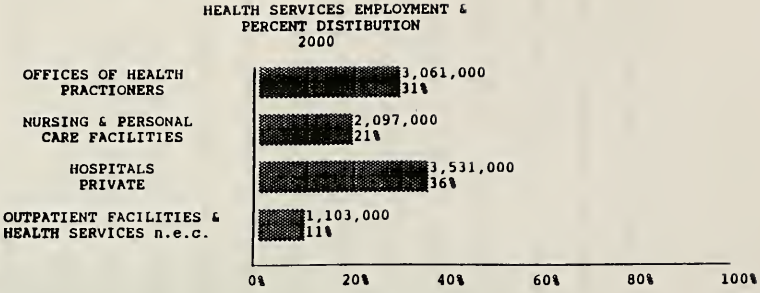
One reason for the relative decline of hospital employment within the broader health services sector is graphically illustrated in Chart II. The average number of hospital inpatient days per 1000 population has been declining steadily since at least 1960. In response, the number of beds per 1000 population maintained by hospitals has declined also. This was made possible largely through technical improvements in hospital health care delivery. The rate of decline slowed between 1978 and 1981, but in mid-1981 the effect of private sector efforts at hospital cost containment began to be felt, and admissions and inpatient days for people under 65 years of age began to fall. Two years later new Medicare payment systems brought further reductions in admissions and inpatient days for the population over 65 years. By 1986,

Chart I
National Health Services Employment & Percent Distribution By Sector' 1972-1979-1986 & Projected to 2000









Note: Percents may not sum to 100 due to rounding.

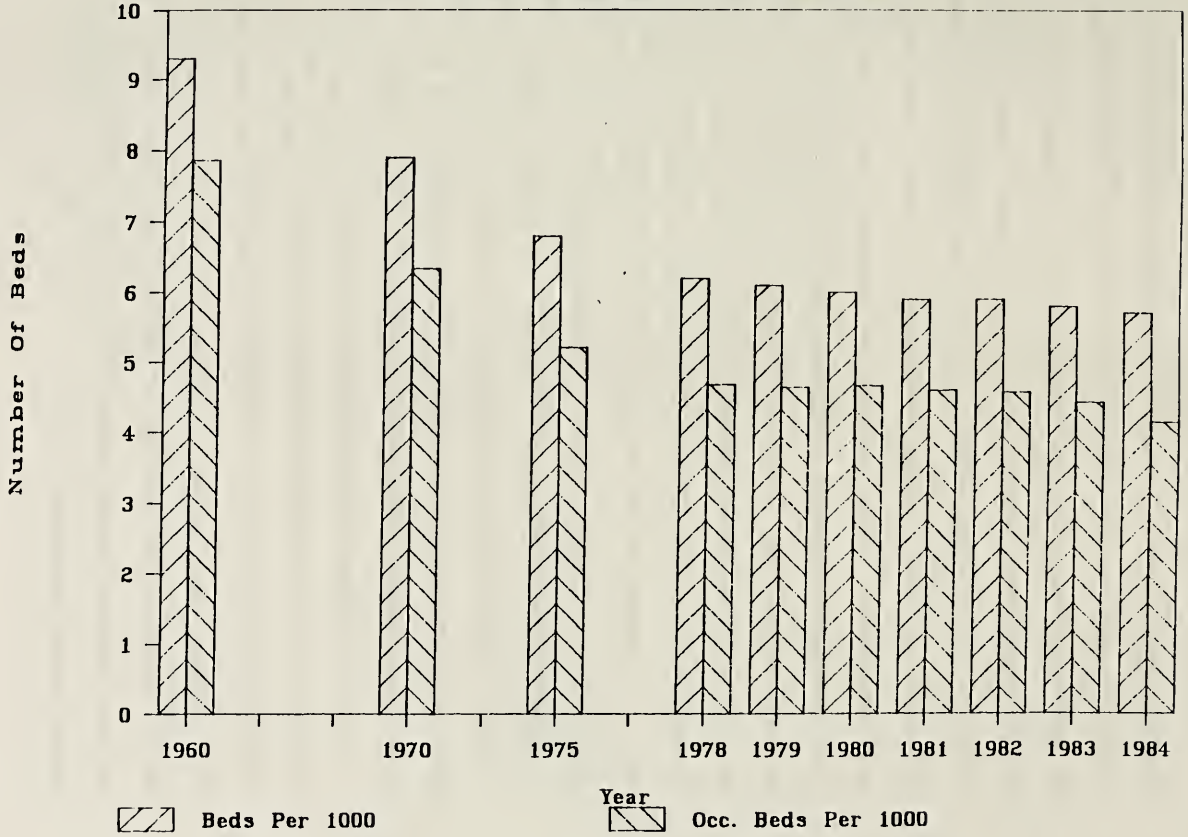
Not elsewhere classified (n.e.c.) includes convalescent homes, domiciliary care, homes for retarded, personal care facilities and homes, and rest homes that all provide health care.

Source: U.S. Department of Labor, Bureau of Labor Statistics,'Industry Output and Employment Through the End of the Century', MONTHLY LABOR REVEIW, September, 1987, vol. 10, Number 9.

CHART II

Hospital Beds And Occupied Beds

Per Thousand Population, U.S. 1960–1984



Footnote: Occupied beds represent average daily occupancy

Source: American Hospital Association, Chicago, IL Hospital Statistics, 1987, annual.

inpatient days were at an 18 year low in absolute terms as well as on a per capita basis.

The apparent contradiction between the slowing of hospital employment growth on the one hand, and sustained high expenditure increases, on the other, is due to the growth of hospital productivity. This in turn, results from both new treatment technologies and the financial incentives of government and insurance cost containment measures, such as Diagnosis Related Group (DRG) reimbursement and the Medicare prospective payment system (PPS). These payment systems limit a hospital's maximum reimbursement to a standard amount, based on the patient's diagnosis. At the same time, the outpatient services provided by private practicioners' offices and clinics tend to be labor intensive activities that benefit less from the technical improvements that hospitals can best use and afford. The result is that national projections forsee faster growth in output than in employment for hospitals, signifying an increase in productivity. The opposite is true for the other three major components of private health services, where slight productivity declines are projected. The rate of productivity increase anticipated for hospitals is exceptional, averaging 1.8 percent annually. By way of comparison, the overall economy may see 1.1 percent annual productivity growth while the health service sector and the broader service sector that includes it are expected to average 0.5 percent.

Although hospitals' productivity growth has outstanding prospects, their average annual rate of growth of output is not expected to exceed that of the overall U.S. economy by much. However, five of the twenty industries with the fastest projected rates of growth of output to the year 2000 are medical or medical related. One is a health service -outpatient facilities, etc - and the others manufacture medical supplies or equipment that may contribute to increased hospital productivity.

Selected Industries with Most Rapid Projected Growth in Output

Industry	Average annual growth
X-ray and other electromedical apparatus	5.2%
Optical and ophthalmic products	5.1%
Medical instruments and supplies	4.4%
Outpatient Facilities and misc. health services	4.4%
Drugs	4.0%

Private health service industries will continue to be a major source of job growth in the national economy, and many of these jobs will be in medical occupations. There will be growth in medical related jobs outside of the health service industries, too. Medical occupations in the U.S. Department of Labor's 1986 job estimates and projections to the year 2000 are listed in Table III. Twelve of these medical occupations are among the twenty occupations expected to experience the most rapid growth nationally to the year 2000. Medical assistants, Physical therapists, and physical and corrective therapy assistants are expected to be second, third, and fourth most rapidly growing, respectively. Home health aides, podiatrists, medical records technicians are in the top ten. Radiologic technologists, dental hygenists, dental assistants, physician assistants, occupational therapists and optometrists are also among the twenty occupations with the greatest growth rate prospects.

Three of the medical occupations shown in Table III are among the top twenty leaders for projected growth in number of jobs. Registered nurses, licensed practical nurses, and nursing aides, orderlies, and attendants to-

TABLE III

Table 3. Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total, all occupations	111,623	126,432	133,030	137,533	14,809	21,407	25,910	13	19	23
Health diagnosing and treating occupations	2,592	3,528	3,674	3,785	935	1,081	1,192	36	42	46
Dentists	151	184	196	203	33	45	52	22	30	34
Dietitians and nutritionists	40	52	54	55	12	14	15	29	34	38
Optometrists	37	52	55	57	15	18	20	40	49	54
Pharmacists	151	179	187	191	29	36	41	19	24	27
Physician assistants	26	39	41	42	13	15	16	49	57	62
Physicians and surgeons	491	645	679	700	154	188	209	31	38	43
Registered nurses	1,406	1,951	2,018	2,077	546	612	671	39	44	48
Therapists	240	352	366	378	112	126	138	46	52	57
Occupational therapists	29	43	45	46	14	15	17	46	52	58
Physical therapists	61	109	115	118	48	53	57	79	87	94
Recreational therapists	29	41	43	44	12	14	15	42	49	52
Respiratory therapists	56	74	76	78	17	19	22	30	34	38
Speech pathologists and audiologists	45	58	61	63	13	15	18	29	34	39
Veterinarians and veterinary inspectors	37	52	54	57	15	17	19	39	46	52
Technician occupations	3,650	4,791	5,053	5,226	1,141	1,403	1,576	31	38	43
Health technicians and technologists	1,598	2,171	2,261	2,326	573	663	728	36	41	46
Dental hygienists	87	134	141	145	47	54	58	54	63	67
Emergency medical technicians	65	73	75	77	8	10	12	12	15	18
Licensed practical nurses	631	835	869	891	204	238	260	32	38	41
Medical and clinical lab technologists and technicians	239	285	296	307	46	57	67	19	24	28
Medical records technicians	40	67	70	72	28	30	32	69	75	80
Opticians, dispensing and measuring	50	69	72	74	19	23	24	39	46	49
Radiologic technologists and technicians	115	183	190	196	67	75	80	58	65	70
Surgical technicians	37	48	49	51	11	12	14	30	33	37
Health service occupations	1,819	2,437	2,549	2,608	618	730	788	34	40	43
Dental assistants	155	231	244	250	76	88	95	49	57	61
Medical assistants	132	239	251	258	107	119	126	81	90	96
Nursing aides and psychiatric aides	1,312	1,673	1,750	1,786	361	437	474	28	33	36
Nursing aides, orderlies, and attendants	1,224	1,584	1,658	1,691	359	433	467	29	35	38
Psychiatric aides	88	90	92	95	2	4	7	2	5	8
Pharmacy assistants	64	77	79	81	13	15	17	20	24	27
Physical and corrective therapy assistants and aides	36	62	65	67	26	29	31	74	82	87

Source: U.S. Department of Labor, Bureau of Labor Statistics, "Industry output and employment through the end of the century", MONTHLY LABOR REVIEW, Sept. 1987, vol. 10, Number 9

gether comprise six percent of total projected job growth for the entire economy.

Nationally, health occupations have a notable record as employers of women and blacks. Table IV shows that the proportion of women and blacks in health occupations is one and a half times as great as that for the overall economy. Women, blacks, and Hispanics are all especially concentrated in the lower skilled and lower paid Health Services category. Coupled with the growing demand for health workers in many occupations, this presents the health service industries with a clear opportunity and challenge to provide the training and career ladder benefits needed to attract workers into the lower job categories and then allow them to advance.

Table IV
U.S. Work Force Composition
For All Health Services Occupations
By Sex, Race, & Hispanic Origin
1986

Occupations	Total Employment (1000's)	Annual Percent Change	Percentage Women	Percentage Black	Percentage Hispanic Origin
	1986	1980-86	1986	1986	1986
Health Managers	127	2.3%	62.2%	8.1%	2.7%
Health Diagnosis	728	2.0%	15.0%	3.3%	3.2%
Health Assessment	2,026	2.7%	85.3%	7.0%	2.8%
Health Technicians	1,124	2.2%	84.1%	12.4%	3.7%
Health Services	1,823	0.0%	89.9%	25.1%	5.7%
Total Health Occupations	5,828	1.6%	75.9%	13.3%	3.9%
Total For All U.S. Industries	109,597	0.8%	44.4%	9.0%	6.6%

Source: U.S. Bureau of the Census, Census of Population, 1980, from Statistical Abstract of U.S. 1984, p. 416.

U.S. Bureau of Labor Statistics, Employment & Earnings, January, 1987, pp. 179-182.

Chapter III: Health Services and Hospitals in the Massachusetts and Boston Economies

The health services economy is large and growing nationally; it is especially powerful and concentrated in Massachusetts, and particularly in Boston. However, only one out of six Massachusetts residents realizes that the health care and biotechnology industries are the state's greatest job producers, although these sectors are much larger than the computer industry that most residents incorrectly believe to be the employment leader.[1] Table V indicates that the presence of the private health service industry is one third greater in Massachusetts than it is in the rest of the nation. Private health services' proportionate share of jobs in Boston is nearly twice the national average, accounting for one job out of every nine in the city.

The Boston and Massachusetts economies specialize in health services, and their health services specialize in hospitals. The proportion of private sector jobs occuring within private hospitals is nearly half again as great in Massachusetts as it is for the nation, and Boston's 7.2 percent job share for private hospitals is two and one quarter times the national average. In Boston, 12.1 percent of all jobs, government as well as private, were in private health service industries or public hospitals in 1985.

Massachusetts' health service economy

Health service industries have been growing in Massachusetts, as elsewhere in the nation. Table VI presents estimates and projections of United States and Massachusetts private health services employment and earnings for 1978-2000. These estimates and projections of the U.S. Department of Commerce

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[1] Marttila and Kiley, Inc. Selected Public Attitudes Toward Health Care and Biotechnology in Massachusetts and The Impact of Health Care and Biomedical/Biotechnology Industries on the Massachusetts Economy, October 1987.

TABLE V

Boston and Massachusetts Specialization in Health Services and Hospitals

	U.S. (1986)	Mass. (1986)	Boston (1985)
Jobs in private Health Services (SIC 80)	6,551,000	239,298	65,900
Percent of all jobs	5.9%	8.2%	11.1%
Percent of private jobs	6.9%	9.2%	13.3%
Jobs in private Hospitals (SIC 806)	3,038,000	122,256	35,458
Percent of private Health Service jobs	46.4%	51.1%	53.8%
Percent of all private jobs	3.2%	4.7%	7.2%
Jobs in all Hospitals	3,717,346	152,790	41.135
Percent of all jobs	3.3%	5.2%	6.9%

Sources: For the United States: U.S. Dept. of Labor, Bureau of Labor Statistics, "Industry output and employment through the end of the century", Monthly Labor Review, Sept. 1987, vol.10, number 9. United States public hospital jobs were derived from American Hospital Association, Hospital Statistics presented as Table No. 148 in the 1987 Statistical Abstract of the United States (U.S. Dept. of Commerce, Bureau of Census) and Health Care Financing Administration, Health Care Financing Review/ Summer 1987, Table 1.
For Massachusetts: State Division of Employment Security, as report in The Impact of Health Services and the Biotechnical Biomedical Industries on the Massachusetts Economy", Marltila and Kiley Inc, October 1987.
For Boston: Jeffrey Brown with Stephen Kunze (December 1986) Boston Employment Trends and Projections by Industry, Boston Redevelopment Authority Research Department., Table 1. Boston hospital employment figures are preliminary estimates of the Boston Redevelopment Authority Research Dept., based largely on reports of the American Hospital Association.

OBERS project are not as recent as the Department of Labor projections that were examined in the preceding chapter, but they do allow us to consider Massachusetts in comparison to the nation. In general, these earlier projections anticipated total national employment growth similar to that of the more recent forecasts, but health services growth slower than in the more recent work.

The Massachusetts economy is seen in these projections as growing faster than the national average, but the state's health service industries are represented as expecting growth below the national average rate for this sector. Recent performance bears this out. The reasons for this are revealing about some of the economic questions facing the Massachusetts health services sector in the future. The demand for health services is largely local. More residents, more resident income, or a greater share of that income devoted to health care all can contribute to increased local demand for personal health care services. Some health services, on the other hand, are exported. Specialty hospital care and research activities are two examples of such exports. Massachusetts is a significant exporter of health services. In fact, it is one of only two states for which the OBERS analysis (Table VI) classifies health services as a "Basic" industry. That is, health services play a significant role in bringing money into the state through export.

The local consumption component of health services demand will be limited (or expanded) by local considerations such as the availability of housing to accommodate population growth, the age composition of our population, income growth, and especially by public policy on health spending. The export component will depend on national or world demand and on the state's competitive position for these services. One common view holds that regional competitive positions in basic industries will tend towards the average, over time. This approach recognizes the fact that we may experience diminishing returns as we

Table VI
Health Services Sector
Employment & Earnings
1978-2000

United States

Year	Employment (thousands) Health Services	Total	Health Employment Percent of Total	Earnings (millions) Health Services	Total	Health Earnings Percent of Total
1978	5,142	102,805	5.0%	$47,406	$885,965	5.4%
1983	6,324	106,891	5.9%	$63,059	$910,248	6.9%
1990	8,012	123,071	6.5%	$87,114	$1,182,443	7.4%
1995	9,103	131,554	6.9%	$103,764	$1,331,369	7.8%
2000	9,892	138,338	7.2%	$117,997	$1,471,249	8.0%
Annual Growth Rates						
1978-1983	4.23%	0.78%		5.87%	0.54%	
1983-1990	3.44%	2.03%		4.72%	3.81%	
1990-1995	2.59%	1.34%		3.56%	2.40%	
1995-2000	1.68%	1.01%		2.60%	2.02%	
1978-2000	3.02%	1.36%		4.23%	2.33%	

Massachusetts

Year	Employment (thousands) Health Services	Total	Health Employment Percent of Total	Earnings (millions) Health Services	Total	Health Earnings Percent of Total
1978	206	2,780	7.4%	$1,685	$23,340	7.2%
1983	241	2,990	8.1%	$2,188	$25,977	8.4%
1990	295	3,523	8.4%	$2,906	$34,113	8.5%
1995	329	3,803	8.6%	$3,391	$38,815	8.7%
2000	348	4,006	8.7%	$3,752	$43,049	8.7%
Annual Growth Rates						
1978-1983	3.18%	1.46%		5.37%	2.16%	
1983-1990	2.94%	2.37%		4.14%	3.97%	
1990-1995	2.18%	1.54%		3.13%	2.62%	
1995-2000	1.14%	1.05%		2.04%	2.09%	
1978-2000	2.41%	1.67%		3.71%	2.82%	

Note: Total employment includes government as well as private industry.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, OBERS, 1985.

exhaust some supply factor necessary for production. Exportable health services, however, may behave in an opposite way. Productive factors such as a concentration of specialized talent, high reputation, managerial ability, and a well developed technical/scientific support network may be enhanced by use, rather than exhausted. Although the future of our local health services economy is difficult to predict, it is useful to remember that it is comprised of a variety of industries and activities.

Employment in the component industries of Massachusetts private health services has followed the general patterns seen nationally, although overall, growth has been slower than the national average. Total industry growth slowed from 3.5 percent, 1978-1983, to 2.0 percent, 1983-1986. See Table VII. Hospitals were the slowest growing major sector, actually experiencing a slight decline in employment between 1983 and 1986. The most rapidly growing major sector was outpatient facilities, which added 5,270 jobs between 1983 and 1986, an average annual growth rate of 21 percent. This was the only major sector to show an increase in growth rates since 1983. Other significant growth occurred in the offices of health practicioners and in miscellaneous health services.

The growth patterns of health service industries are presently undergoing considerable change due to technical and financial factors, but over the long term, growth has been extremely stable and robust. Massachusetts' health service employment grew during every single year from 1969 through 1986, averaging 4.1 percent annually. In contrast, the state's total employment posted declines in three of those years, averaging 1.8 percent annual growth over the entire period. Health services employment owes this notable stability to the priority that consumers place on personal health care and to the third party payment system. The three-fourths share of national health expenditures that are currently paid through private insurance or government programs

Table VII
Massachusetts Health Services Sector
Employment In S.I.C. 80
1978-1983-1986

SIC Code	Component	1978	1983	1986	Annual Growth Rate (%) 1978-83	1983-86
801	M.D. Offices & Clinics	15,130	20,630	23,944	6.40	5.09
802	Dentist Offices	9,242	12,046	13,447	5.44	3.74
803	Ostepathic Physicians	46	43	44	-1.34	0.77
804	Other Offices	1,460	3,013	3,950	15.59	9.45
805	Nursing Care Facilities	43,118	48,609	48,988	2.43	0.26
806	Hospitals	109,516	123,044	122,256	2.36	-0.21
807	Med. & Dental Laboratories	3,006	3,789	3,968	4.74	1.55
808	Outpatient Facilities	4,448	6,794	12,064	8.84	21.09
809	Health & Allied Services	4,160	7,730	10,637	13.19	11.23
	Private Sector Total	190,126	225,698	239,298	3.49	1.97
	Public Sector Hospitals & Clinics	33,385 (1979)	32,338	32,836	-0.79	0.51
	Public & Private Sector Total	223,511	258,036	272,134	2.91	1.79

Note: 1978 public sector health employment number is actually the 1979 figure, since detailed records for state employees were not kept until 1979.

Sources: Massachusetts Division of Employment Security, reported in The Impact of Health Services & the Biotechnical/Biomedical Industries on the Mass. Economy, Marttila & Kiley, 1987.

insulates the health services sector from general downturns and provides employment insurance to health industries.

Boston's hospitals

Boston's 32 hospitals and related medical institutions are listed in Table VIII, along with selected data for 1980 and 1985, reported by the American Hospital Association (A.H.A). Total 1985 workforce for these institutions is estimated by the Boston Redevelopment Authority at 41,135 jobs, after correcting for missing responses. These A.H.A. data reflect the influence of national trends on Boston hospitals. Hospitals responding to the "number of beds" question in both years showed a two percent decline in the number of inpatient beds maintained. Those listing occupancy rates for both 1980 and 1985 experienced an unweighted average decline of 5.2 percentage points, from 85.5 percent occupancy in 1980, to an 80.3 percent rate five years later, Hospitals answering all questions in a given year reported that payroll accounted for 50 percent of total expenses in 1980, declining to 45 percent in 1985. These same groups reported an average pay (payroll divided by personnel) of $15,685 in 1980 and $22,249 in 1985. This represents an increase of 6.7 percent over this five year period, after adjusting for inflation as measured by the Boston Consumer Price Index. The personnel-to-bed ratio increased by more than one third, from 3.6 to 4.9, caused by the combination of larger staff and lower bed count. These observations and those that follow summarize the experience of reporting hospitals. Not all hospitals responded to all questions, and respondents differed from year to year.

Preliminary indications from the Medical Industry Survey being conducted by the Policy Development and Research Department (PDR) of the Boston Redevelopment Authority point to a continuation of major trends for patient care -

TABLE VIII

BOSTON HOSPITALS AND RELATED MAJOR MEDICAL INSTITUTES, SELECTED DATA, 1980 AND 1985

HOSPITALS	1985 DATA					1980 DATA					% CHANGE 1980-1985				
	Occupancy Rate (%)	Total Expenses ($1000)	Total Payroll ($1000)	Personnel	# of Beds	Occupancy Rate (%)	Total Expenses ($1000)	Total Payroll ($1000)	Personnel	# of Beds	Occupancy Rate*	Total Expenses	Total Payroll	Personnel	# of Beds
Arbour Psychiatric Hospital	86.4	12,616	5,515	221	118										
Beth Israel Hospital	90.1	154,860	64,325	3,481	465	89.6	73,998	36,972	2,695	452	0.5	109.3	74.0	29.2	2.9
Boston City Hospital					398										
Brigham and Women's Hospital	83.5	241,031	93,976	4,760	720	83.1	124,368		5,274	676	0.4	93.8		-9.7	6.5
Carney Hospital	81.0	66,876	35,399	1,541	422	89.9	40,354	22,732	1,465	376	-8.9	65.7	55.7	5.2	12.2
Children's Hospital	81.1	166,896	79,955	3,277	399	80.4	109,381	54,079	3,446	339	0.7	52.6	47.8	-4.9	17.7
Dana-Farber Cancer Institute	82.5	59,242	25,694	1,077	57	88.1	35,395		869	42	-5.6	67.4		23.9	35.7
Dorchester Mental Health Center	86.0	6,046		303	57										
Faulkner Hospital	78.8	44,566	20,747	939	258	95	31,676	14,478	869	259	-16.2	40.7	43.3	8.1	-0.4
Hahnemann Hospital	72.3	6,788	2,998	172	65	60	4,211	1,880	152	65	12.3	61.2	59.5	13.2	0.0
Hebrew Rehabilitation Center for Aged	97.0	22,616	12,879	607	725	97	15,405	8,212	592	725	0	46.8	56.8	2.5	0.0
Jewish Memorial Hospital	86.5	13,956	8,041	402	207	93.7	8,841	5,226	394	394	-7.2	57.9	53.9	2.0	-47.5
Joslin Diabetes Center					NA										
Kennedy Memorial Hospital for Children	68.0	14,371	8,610	430	100	77	9,110	5,905	412	100	-9	57.7	45.8	4.4	0.0
Lemuel Shattuck Hospital					235	64	16,290	9,523	711	250					-6.0
Long Island Hospital (Mattapan Hosp.)					188					165					13.9
Mass. Eye and Ear Infirmary	60.9	60,108	19,802	1,029	174	86.8	27,811	12,236	904	174	-25.9	116.1	61.8	13.8	0.0
Mass. General Hospital	81.2	296,792	140,637	6,085	1,100	88.5	194,246	99,179	6,079		-7.3	52.8	41.8	0.1	
Mass. Mental Health Center	100.0	10,971	6,824	314	40	93.8	6,782	5,206	341	112	6.2	61.8	31.1	-7.9	-64.3
Mass. Osteopathic Hospital and Medical Center					80										
Mattapan Chronic Disease Hospital	86.1			336	151										
New England Baptist Hospital	79.6	44,599	22,045	965	245	89.4	28,977		982	245	-9.8	53.9		-1.7	0.0
New England Deaconess Hospital	83.6	120,131		2,433	489	94.7	69,248	35,303	2,051	489	-11.1	73.5		18.6	0.0
New England Medical Center (Tufts)	89.2	155,301	59,143	2,457	469	87.6	97,069	37,205	2,327	452	1.6	60.0	59.0	5.6	3.8
Shriners Burns Institute	63.3			213	30	63.3			145	30	0			46.9	0.0
Spaulding Rehabilitation Hospital	92.3	35,000		794	284										
St. Elizabeth's of Boston Hospital	81.3	86,961	42,403	1,847	350	85.2	49,241	24,553	1,536	385	-3.9	76.6	72.7	20.2	-9.1
St. John of God Hospital	95.3	5,772	2,841	142	64	97.5	3,365	1,722	148	79	-2.2	71.5	65.0	-4.1	-19.0
St. Margaret's Hospital for Women	69.2	21,963	12,930	614	150	78.7	12,182	6,638	490	136	-9.5	80.3	94.8	25.3	10.3
University Hospital (Boston University)	82.8	88,677	42,866	1,445	379					379					0.0
Veterans Administration Medical Center (Jamaica Plain)					274	72.8	26,763	16,554	836	279					-1.8
Veterans Administration Medical Center (West Roxbury)	73.2	79,213		1,650	764	75.3	52,672	30,290	1,588	801	-2.1	50.4		3.9	-4.6
TOTALS/AVERAGES	82.0	1,815,352	707,631	37,534	9,457	74.3	1,037,385	427,893	34,306	7,404	7.7	75.0	65.4	9.4	27.7
TOTALS/AVERAGES FOR HOSPITALS ANSWERING ALL QUESTION IN THE YEAR INDICATED	82.3	1,574,962	707,631	31,805	6,507	84.4	654,399	328,714	20,957	5,867					
TOTALS AND CHANGES FOR HOSPITALS ANSWERING THIS QUESTION BOTH YEARS	80.3	1,673,013	517,535	34,435	7,269	85.5	994,332	336,223	32,759	7,404	-5.2	68.3	53.9	5.1	-1.8

* Number of percentage points

Source: Ameri... Hospital Association Guide To The Health Care Fields, 1986 And 1981

namely, that patients are being discharged in a shorter period of time and that outpatient care is often being substituted for inpatient care where possible.

The number of patients admitted to our initial sample of 15 Boston hospitals has risen slightly over the last five years, from 108,482 to 111,918. This represents a 3.2 percent increase. Because our sample does not include many of the largest hospitals in the city, this increase may not be representative. However, it may reflect an exceptional ability to compete in a changing environment that places greater emphasis on quality, specialty services, and innovative management.

In our sample of early respondent institutions, which includes several long term care and rehabilitation facilities, the average length of stay five years ago was 65.4 days. Last year, it had dropped to 23.8 days, a decline of almost 64 percent.

Bed occupancy rates of institutions in our sample have also fallen. Five years ago, the average occupancy rate was 86.1%. Last year, it was down to 75.8%. The fall in occupancy rates for these 15 Boston hospitals is due entirely to reductions in average length of stay. The Massachusetts Rate Setting Commission recently reported a 1986 state average occupancy rate of only 65.6 percent (The Boston Globe, November 1, 1987). Nationally, inpatient days were at an 18 year low in 1986.

Boston hospitals contributing early responses to the PDR Medical Industry Survey anticipate employment growth exceeding national and state projections. Two factors that appear to contribute to this bright outlook for job opportunity are current staff shortages for patient care and growth prospects for research activities. Interviews with hospital administrators have revealed widespread concern over shortages of nurses, nurses' aides, secretarial/ clerical staff, and cleaning workers.

Research activities account for an estimated nine percent of current employment in Boston hospitals, and this proportion could grow to thirteen percent in five years, if all expansion needs for space are met. Medical research is the subject of the following chapter.

The Boston hospitals providing early survey responses will have to increase their workforce by 3.5 percent annually over the next five years to meet expected staffing needs. This sample of twelve hospitals represents just one sixth of the total workforce estimated for all Boston hospitals, but important aspects of their collective responses are consistent with other national and local observations. Table IX shows the results for this sample, as well as their implications for city wide hospital employment.

Nearly forty percent of additional personnel growth expected by responding hospitals over the next five years is concentrated in nursing, where staff increases of over one fourth are needed. Nurses' aides are projected to enjoy a notable 18.4 percent increase in employment over the next five years. If these staffing needs are representative of all Boston hospitals, then 3,870 of the 7,651 positions to be filled in hospitals across the city by 1992 will be for nurses and nurses' aides. However, when questioned by interviewers for this study, administrators at most Boston hospitals expressed concern over the difficulty of attracting and maintaining adequate nursing staff.

Recently the chief executive officer of the Lahey Clinic Medical Center in Burlington, Mass. characterized the situation as "acute", stating: "There are a substantial number of beds closed in teaching hospitals and Lahey due to the nursing shortage. "(The Boston Globe, October 30, 1987). Although representatives of other Boston area hospitals denied that patient care was suffering or that beds were closed because of a nursing shortage, attempts at a solution testify to the perception of a problem. The solution implemented by Faulkner

Hospital in Boston during September 1987 was a new wage contract negotiated at the hospital's initiative, before the old contract expired. "The salaries agreed to at Faulkner are the first to face up to the reality that low pay has been driving women away from nursing.... It marks the first time that nurses' salaries will be comparable to school teachers'" (Boston Globe editorial, September 15, 1987).

In that same month, a new program was implemented at the Veterans Administration Medical Center in White River Junction, Vermont to give that hospital "something special to attract and keep staff." The hospital contracted with a local college to send instructors to the hospital to teach college-level nursing courses. Nurses' aides, licensed practical nurses, and registered nurses can pursue either an associate's or bachelor's degree in nursing at the hospital's expense (The New York Times , October 9, 1987).

Non-medical support occupations were cited by many hospitals as areas of current staff shortage, and this is reflected in early survey results. The 25 percent increase in cleaning staff desired by responding hospitals would account for 834 new jobs over the next five years, if applied to all hospitals across the city. An increase of nearly 24 percent for secrectarial/clerical workers account for over one fifth of the net job gain anticipated by early survey participants, and would translate into 1,674 new positions city wide by 1992.

Smaller occupational catagories that might see notable growth over the next five years include therapists, research scientists, laboratory technicians, and computer technicians. Very little net growth was forseen for doctors or administrators. It should be noted, however, that many hospitals have very few doctors actually on staff. The American Medical Association has reported that in 1983, only 6.1 percent of active doctors were full-time

TABLE IX

EMPLOYMENT PROFILE OF TWELVE BOSTON HOSPITALS, 1987 AND 1992

Occupation	Total Employed 1987 number	Total Employed 1987 % of total	Total Needed In Five Years number	Total Needed In Five Years % of total	Projected Job Growth number	Projected Job Growth % change this occupation	Projected Job Growth % of total change	Annual % Change
Doctor	833	12.3	879	10.9	46	5.5	3.6	1.1
Nurses	1879	27.8	2381	29.6	501	26.7	39.6	4.8
Therapists	245	3.6	287	3.6	42	17.0	3.3	3.2
Research Scientists	123	1.8	144	1.8	21	17.1	1.7	3.2
Lab Technicians	189	2.8	234	2.9	46	24.1	3.6	4.4
Computer Technicians	67	1.0	85	1.1	18	26.1	1.4	4.8
Nurses' Aides	756	11.2	895	11.1	139	18.4	11.0	3.4
Administrators	196	2.9	204	2.5	8	4.1	0.6	0.8
Sec./Clerical	1163	17.2	1440	17.9	277	23.8	21.9	4.4
Cleaning Staff	547	8.1	685	8.5	138	25.2	10.9	4.6
Food Services	538	8.0	583	7.3	45	8.4	3.6	1.6
Other	230	3.4	216	2.7	-14	-6.1	-1.1	-1.2
TOTAL	6766	100	8031	100	1266	18.7	100	3.5

PRELIMINARY ESTIMATES,
EMPLOYMENT PROFILE OF ALL BOSTON HOSPITALS, 1987 AND 1992

Occupation	Total Employed 1987 number	Total Employed 1987 % of total	Total Needed In Five Years number	Total Needed In Five Years % of total	Projected Job Growth number	Projected Job Growth % change this occupation	Projected Job Growth % of total change	Annual % Change
Doctor	5035	12.3	5313	10.9	278	5.5	3.6	1.1
Nurses	11359	27.8	14389	29.6	3030	26.7	39.6	4.8
Therapists	1481	3.6	1732	3.6	251	17.0	3.3	3.2
Research Scientists	743	1.8	870	1.8	127	17.1	1.7	3.2
Lab Technicians	1139	2.8	1414	2.9	275	24.1	3.6	4.4
Computer Technicians	405	1.0	511	1.1	106	26.1	1.4	4.8
Nurses' Aides	4568	11.2	5409	11.1	840	18.4	11.0	3.4
Administrators	1185	2.9	1233	2.5	48	4.1	0.6	0.8
Sec./Clerical	7030	17.2	8704	17.9	1674	23.8	21.9	4.4
Cleaning Staff	3306	8.1	4140	8.5	834	25.2	10.9	4.6
Food Services	3252	8.0	3524	7.3	272	8.4	3.6	1.6
Other	1391	3.4	1307	2.7	-85	-6.1	-1.1	-1.2
TOTAL	40895	100	48546	100	7651	18.7	100	3.5

Source: Medical Industry Survey Team, Boston Redevelopment Authority Policy Development And Research Department

TABLE X

PAYROLL DISTRIBUTION OF TWELVE BOSTON HOSPITALS, 1987 AND 1992

	Salary & Payroll 1987			In Five Years (at same wage)			Projected Payroll Growth			
Occupation	number employed	average salary ($1000)	total pay ($1000)	number employed	average salary ($1000)	total pay ($1000)	change in payroll ($1000)	% change in payroll this occupation	% of total change	annual % change
Doctor	833	47.5	39,567.5	879	47.5	41,752.5	2,185	5.5	7.2	1.1
Nurses	1,879	30.7	57,694.5	2,381	30.7	73,081.4	15,387	26.7	50.5	4.8
Therapists	245	25.7	6,296.5	287	25.7	7,365.6	1,069	17.0	3.5	3.2
Research Scientists	123	32.2	3,960.6	144	32.2	4,636.8	676	17.1	2.2	3.2
Lab Technitians	189	19.3	3,638.1	234	19.3	4,516.2	878	24.1	2.9	4.4
Computor Technitians	67	19.8	1,326.6	85	19.8	1,673.1	347	26.1	1.1	4.8
Nurses' Aides	756	15.9	12,017.2	895	15.9	14,227.3	2,210	18.4	7.3	3.4
Administrators	196	58.4	11,446.4	204	58.4	11,913.6	467	4.1	1.5	0.8
Sec./Clerical	1,163	17.8	20,701.4	1,440	17.8	25,632.0	4,931	23.8	16.2	4.4
Cleaning Staff	547	14.1	7,711.3	685	14.1	9,657.1	1,946	25.2	6.4	4.6
Food Services	538	15.1	8,123.8	583	15.1	8,803.3	679	8.4	2.2	1.6
Other	230	23.4	5,385.5	216	23.4	5,057.9	(328)	-6.1	-1.1	-1.2
TOTAL	6,766	26.3	177,869.4	8,031	25.9	208,316.8	30,447	17.1	100	3.2

PRELIMENARY ESTIMATES,
PAYROLLS FOR ALL BOSTON HOSPITALS, 1987 AND 1992

	Salary & Payroll 1987			In Five Years (at same wage)			Projected Payroll Growth			
Occupation	number employed	average salary ($1000)	total pay ($1000)	number employed	average salary ($1000)	total pay ($1000)	change in payroll ($1000)	% change in payroll this occupation	% of total change	annual % change
Doctor	5,035	47.5	239,162.5	5,313	47.5	252,367.5	13,205	5.5	7.2	1.1
Nurses	11,359	30.7	348,721.3	14,389	30.7	441,742.3	93,021	26.7	50.5	4.8
Therapists	1,481	25.7	38,061.7	1,732	25.7	44,512.4	6,451	16.9	3.5	3.2
Research Scientists	743	32.2	23,924.6	870	32.2	28,014.0	4,089	17.1	2.2	3.2
Lab Technitians	1,139	19.3	21,982.7	1,414	19.3	27,290.2	5,308	24.1	2.9	4.4
Computor Technitians	405	19.8	8,019.0	511	19.8	10,117.8	2,099	26.2	1.1	4.8
Nurses' Aides	4,568	15.9	72,631.2	5,409	15.9	86,003.1	13,372	18.4	7.3	3.4
Administrators	1,185	58.4	69,204.0	1,233	58.4	72,007.2	2,803	4.1	1.5	0.8
Sec./Clerical	7,030	17.8	125,134.0	8,704	17.8	154,931.2	29,797	23.8	16.2	4.4
Cleaning Staff	3,306	14.1	46,614.6	4,140	14.1	58,374.0	11,759	25.2	6.4	4.6
Food Services	3,252	15.1	49,105.2	3,524	15.1	53,212.4	4,107	8.4	2.2	1.6
Other	1,391	23.4	32,549.4	1,307	23.4	30,583.8	(1,966)	-6.0	-1.1	-1.2
TOTAL	40,894	26.3	1,075,110.2	48,546	25.9	1,259,155.9	184,046	17.1	100	3.2

Source: Medical Industry Survey Team, Boston Redevelopment Authority Policy Development And Research Department

hospital staff. As major employers, Boston hospitals are also major sources of earnings. The average 1987 salary for the twelve hospitals contributing the first responses to the PDR survey was $26,300. See Table X. If the payroll characteristics of this sample are typical of Boston hospitals, then the total annual payroll for all hospitals in the city would exceed $1 billion. The net employment growth anticipated by survey respondents implies a $184 million increase in city wide hospital payroll in five years, if there was no change in wages for each occupational catagory. The weighted average wage for all workers would decline slightly due to greater need for staff in lower paying occupations.

Medical development and building in Boston

Boston hospitals are among the city's major developers and investors. Building projects completed since 1975 and anticipated through 1989 will add over $808 million worth of medical facilities, measured in constant dollars at 1986 price levels. This makes medical uses the city's third largest realty investment sector, after office and housing development, and before hotels. See Chart III. Actual hospital and health service investment is much greater than this figure, which represents only the "hard" construction cost of buildings, excluding planning, design, financing, and equipment costs.

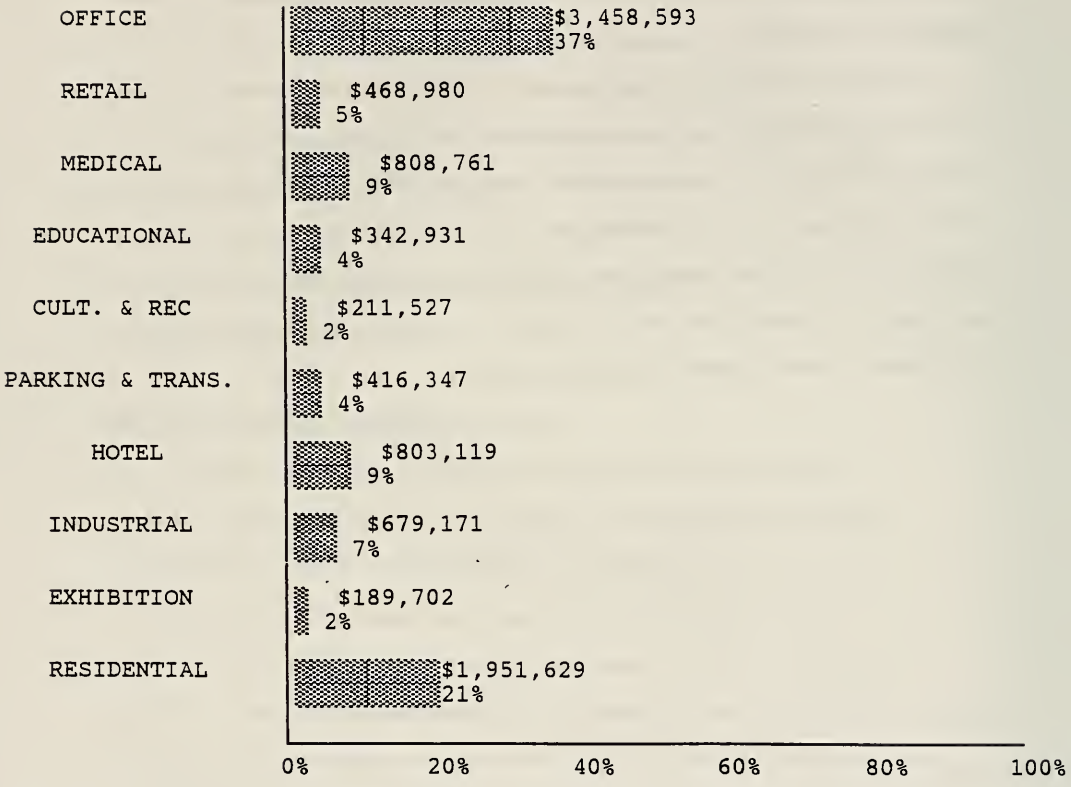
Medical building projects will have added over four million square feet of newly constructed space while another million square feet are renovated or converted from other uses. Additionally, 645 beds for hospital inpatients or nursing home clients have been completed or are planned for completion before 1990.

Over forty percent of the recent financial investment in Boston medical facilities is located within the Longwood Medical Area surrounding Harvard

Medical School. Tables showing the schedule and location of medical facility investment are contained in Appendix A to this report: A Summary and Survey of Medical Development in Boston, 1975-1989. This appendix also contains an itemized list of projects.

A development related to the medical sector in Boston is the Medical Area Total Energy Plant (MATEP). This power plant was built to provide power to the medical institutions of the Longwood Medical Area. MATEP came on line in 1981 at a cost of $372 million. It is classified as an industrial rather than medical project. If MATEP were added to the medical sector investment total, that sum would be $1.2 billion (1986 constant dollars), or one and one half times the investment for strictly medical building construction.

CHART III
C I T Y O F B O S T O N
DEVELOPMENT COSTS &
PERCENT DISTRIBUTION BY SECTOR
1975-1989



Note: All development costs are in 1986 constant $1,000's.
Percents may not sum to 100 due to rounding.

CHAPTER IV: BIOMEDICAL RESEARCH IN BOSTON

The biomedical research component of the Boston medical industry appears to be very healthy and has an excellent prognosis for future growth. Most of this strength stems from the linkages among medical and educational institutions, and the resulting "critical mass" of reputation and talent.

Nationally, non-commercial research expenditures have risen from $7.3 billion in 1980 to $8.2 billion in 1986, and are projected to increase to $10.3 billion in 1990 and up to $11.7 billion by the year 2000, all in 1986 constant dollars. This amounts to a 2.0 percent annual real growth rate during 1980-1986, less than of half the 5.2 percent annual real growth rate for total national health expenditures over these years. A growth rate of 2.6 percent annually is projected for non-commercial research expenditures, 1986-2000, which is slightly greater than half the 4.9 percent projected overall health spending growth rate. These projections of the Federal Health Care Financing Administration are based largely on the extension of past trends. In fact, the context for non-commercial medical research has been changing, with increased public attention to AIDS and other health problems, the growing importance of new technology in raising medical --and especially hospital-- productivity, and rising expectations for profitable commercial applications. Although the allocation of research funds takes place in a highly competitive environment, the total amount of such funds is largely determined through government legislation, appropriation, and administration.

The largest single source of funding for non-commercial medical research is the National Institutes of Health (NIH) which was responsible for $3.5 billion, or 47 percent, of total research grants in 1985. The NIH total grant monies grew by $791 million between 1981 and 1985, an average annual increase

of 6.7 percent after adjusting for inflation.

In 1985, the state of Massachusetts received 11 percent of the NIH grant monies which totalled $382.5 million, up from the $279.7 million obtained in 1981, for an average annual increase of 8.1 percent after adjusting for inflation. Massachusetts leads the nation in NIH grant money on a per capita basis with $78 in 1985 (Table XI). If Massachusetts retains its 11 percent share of NIH funding, it could be receiving $523 million in 1990, and $594 million by the year 2000. This would mean $90 per capita in the year 2000, which is a 12 percent increase over the 1985 per capita figure (all in 1985 constant dollars).

The city of Boston is second only to New York City in aggregate NIH grants and leads the nation on a per capita basis with $447 compared to New York's $49 (Table XI). In 1985, Boston received 70 percent of the Massachusetts NIH grant awards, which amounted to $268.5 million, an average annual increase of 7.6 percent over the 1981 figure of $200.2 million. If the current share distribution continues, Boston could potentially receive $366 million in 1990 and $415 million in the year 2000 (all in 1985 constant dollars).

Table XI
National Institutes of Health
Research Grants Per Capita, Selected
Cities & States, 1985

State	Research Grants Per Capita	City	Research Grants Per Capita
Massachusetts	$78.07	Boston	$446.76
Maryland	$57.85	Philadelphia	$94.11
Connecticut	$36.86	Washington, D.C.	$68.16
New York	$31.31	New York City	$48.85

Source: National Institutes of Health: Research Grants, Research and Development Contracts, Training Grants, 1985.

The research money benefits both Boston and its hospitals. Boston benefits by the substantial amounts of money brought into the city each year, which is circulated throughout its economy. In fact, nine of the top 11 hospitals in the U.S. receiving the most NIH funding in 1985, were Boston hospitals. Beyond the financial rewards, the hospitals benefit from the high prestige associated with biomedical research. The reputation that the hospitals develop from research activities helps them attract the best and the brightest doctors and research scientists, which can lead to additional research funding in the future.

There are at least 22 institutions in Boston that conduct biomedical research and an additional 6 biotechnology firms that are doing research, producing a product, or providing support to the industry. Out of the 22 institutions, 17 are hospitals and medical schools, which provide patient care and teach medicine as well as perform research. The remaining 5 facilities are non-profit research institutes which perform either general or specialized research with grant money from NIH and other government agencies as well as private sources.

Hospitals and medical schools

The 17 hospitals and medical schools are the largest component of the Boston research sector. These institutions have a combined research budget for 1987 estimated at $334.7 million. The survey has revealed that four of these institutions had a combined 1987 research budget of $64.2 million. Their total in 1982 was only $35.6 million (in 1987 constant dollars). This five year increase of 80 percent averages 12.5 percent annually.

Five institutions in the survey responded to both questions asking: "What is your current research budget?", and "How much additional research funding

could you obtain if you had the space and personnel to conduct the research?" The current budget for the five hospitals is $24 million, and the potential for additional research funding for the five hospitals is estimated at $12.5 million, a 52 percent increase. If all of Boston's hospitals and medical schools expanded their research budgets by 52 percent, the combined budget would increase from the present $334.7 million to $508.7 million.

The hospitals and medical schools now occupy an estimated 1.5 million square feet (s.f.) of research space. These institutions anticipate a demand for an additional 1.2 million s.f., of which one-fourth is under construction and the remaining three-fourths is in the planning and proposal stages (Table XII). These are preliminary figures that do not have the benefit of completed survey responses.

In the survey, six hospitals reported a combined total of 210,226 s.f. of space devoted to research, and a combined full time equivalent work force of 532. This average space allocation of 395 square feet per worker and the preliminary inventory of existing and anticipated space were used to estimate currentand future research employment.

The existing research employment for Boston hospitals and medical schools is estimated to be 4,446 full time positions (Table XII). In the near future, 785 additional jobs will be accommodated by the space now under construction and in the next five years, 2,290 more research jobs may be accommodated by new space planned and proposed. This total potential increase of 3,075 jobs for hospitals and medical schools combined would represent an annual growth rate of 11 percent if accomplished in five years (Table XII).

If only hospital research employment is examined, there are currently an estimated 3,763 full time positions (Table XII), which is 9.2 percent of total hospital employment, estimated at 40,895 jobs (Table IX). In the next five

Table XII
Estimated Hospital & Medical School
Research Facilities & Employment,
1987 and Anticipated by 1992

Institutional Areas	Existing		Under Construction		Planned & Proposed	
	Square Feet	Estimated Employment	Square Feet	Estimated Employment	Square Feet	Estimated Employment
Longwood Medical Area						
Hospitals	625,875	1,584	190,000	481	467,500	1,184
Medical Schools	45,000	114	0	0	0	0
Total	670,875	1,698	190,000	481	467,500	1,184
West End Area						
Hospitals *	331,900	1,462	83,000	210	290,000	734
South Cove Area						
Hospitals	215,100	545	0	0	0	0
Medical Schools	224,900	569	37,000	94	122,000	309
Total	440,000	1,114	37,000	94	122,000	309
City-Wide						
Hospitals	67,837	172	0	0	25,000	63
Hospital Total	1,240,712	3,763	273,000	691	782,500	1,981
Medical School Total	269,900	683	37,000	94	122,000	309
Grand Total	1,510,612	4,446	310,000	785	904,500	2,290

Note: Employment was estimated by dividing square footage of the research facilities by 395 square feet per employee. Based on results from 6 institutions.

Sources: Thomas J. Andrews, "Opportunities and Constraints in Developing Biomedical Research Space For Teaching Hospitals", Thesis M.I.T., 1987.
BRA Research Dept, Medical Industry Survey, 1987.

Footnote: * Massachusetts General Hospital employment is calculated based on 200 square feet per research worker.

years, hospital research is anticipated to increase to 6,435 positions (Table XII), as total hospital employment climbs to 48,546 (Table IX). Research may then account for 13.2 percent of hospital personnel by 1992. Hospital medical research employment is anticipated to grow at an average rate of 11.2 percent annually over the next five years, while surveyed hospitals anticipate a 3.5 percent annual growth for total employment over the same period.

The average salary for an employee on a hospital and medical school research staff may be in the range of $27,258. Average salaries by occupation range from $68,000 for doctors to $11,750 for janitorial staff. Salaries vary radically in research because the level and type of education required is so diverse (Table XIII).

Half of the new jobs -about 1,470 or 48 percent- will require at least a collegedegree. These positions include laboratory technicians, computer technicians, some types of administrators and others. These jobs pay an average wage in the vicinity of $22,712 with an average range from $20,250 to $29,600 for hospitals reporting to date.

Twenty-nine percent, or 889, of the new research positions will not require a college degree. These jobs include secretarial/clerical positions, janitorial staff and others. These positions pay an average of $17,335 and their average range is from $11,750 to $21,000.

The top paying jobs in research require advanced degrees: they account for 23 percent or 717 of the anticipated new research positions, including research scientists, doctors, and some administrators. These jobs pay an average of $48,961 and have an average range of between $29,600 and $68,000 (Table XIII).

The location of future research facilities and jobs in Boston is an important issue; 10 of the institutions responded to the question in our survey regarding consideration of an off site research facility at one or more of four

Table XIII
Medical Research Employment &
Average Salaries By Educational Attainment
For Hospitals & Medical Schools,
1987 and Anticipated by 1992

Job Status	Advanced Degree	College Degree	No College Degree	Total
Existing Research Employment 1987	1,036	2,125	1,285	4,446
Future Research Jobs Coming on Line 1988-1989	183	375	227	785
Future Research Jobs 1990-1992	534	1,095	662	2,290
Total Future Research Jobs 1988-1992	717	1,470	889	3,075
Percent Distribution	23	48	29	100
Average Salary	$48,961	$22,712	$17,335	$27,258
Average Salary Range	$29,600 - $68,000	$20,250 - $29,600	$11,750 - $21,000	$11,750 - $68,000

Notes: Total employment by job status derived from Table R-II.

Percent distribution by education level from six reporting institutions.

Average salary by education level from six reporting institutions.

Source: Medical Industry Survey, BRA, Research Dept., 1987.

Table XIV
Medical Research Employment, Salaries,
and Education Level By Occupation For
Hospitals and Medical Schools
1987 and Anticipated by 1992

Occupations	Percent Distribution (Sample)	Jobs Accommodated By Existing Space	Jobs Accommodated By Space Planned, Proposed & Under Construction	Average Salary & Weighed Average	Education Level
Research Scientists	13.4	596	412	$36,417	Advanced
Doctors	9.3	413	286	$68,000	Advanced
Laboratory Techs	26.4	1,174	812	$21,200	College
Computer Techs	10.7	476	329	$20,250	College
Administrators	10.3	458	317	$29,600	Adv./Coll.
Secretarial/Clerical	21.9	974	673	$17,333	No College
Janitorial Staff	2.8	124	86	$11,750	No College
Other Staff	5.2	231	160	$21,000	Coll/No Coll
Total	100.0	4,446	3,075	$27,258	

Notes: Percent distribution data from 6 reporting institutions.
Jobs accomodated totals from table R-II.
Average salary data from 6 reporting institutions.
Education data from 6 reporting institutions.

Source: BRA Research Dept., Medical Industry Survey, 1987.

locations: Charlestown Navy Yard, Sears Building, Parcel 18, and South End Technology Square. Five out of the 10 said they would consider the Charlestown Navy Yard. Five of the respondents also said they would consider the Sears Building in the Fenway. Parcel 18 which is adjacent to Ruggles Station on the MBTA Orange Line, received a favorable response from 4 of the institutions and the South End Technology Square site would interest 3 of the institutions responding.

The reporting institutions considered the closest site the most favorable because of transportation issues. For example, Building 149 in the Charlestown Navy Yard is about 1 mile from the West End institutions. Massachusetts General Hospital (M.G.H.) is the first teaching hospital in Boston to move its research activities off-campus to the Charlestown Navy Yard. In his M.I.T. thesis, "Opportunities and Constraints in Developing Biomedical Research Space for Teaching Hospitals", Thomas Andrews reports on MGH's decision:

> At first, this move was perceived to be difficult because the new facility will be removed from the researchers' patient care and teaching duties. Once a few key researchers discovered the spaciousness and quality of the space at the new facility they agreed to make the move to Charlestown. These respected individuals provided the critical mass and were followed by many others who wished to maintain proximity to the most prestigious research activities.

The leasing of research space is also considered to be an important option for facility expansion for both the institutions and the City of Boston, and has been utilized by at least two institutions thus far, including Brigham and Women's Hospital and Massachusetts General Hospital. There are three major advantages to leasing arrangements. First, lease payments for research facilities are totally reimbursable through federal research grants, whereas if a hospital built its own research facility, the interest payments would not be reimbursable without a difficult to obtain waiver. Second, when an institution leases research space instead of building new space, it avoids additional debt

and the potential of jeopardizing its bond rating. This was a factor in Massachusetts General Hospital's decision to lease Building 149, according to Thomas Andrews. Third, the leased property is taxable and some of the grant payments therefore are transfer payments from the federal government indirectly to the city of Boston. These payments help offset the costs of public services such as, snow removal, police and fire protection, and a host of others which are usually not recovered because the properties that hospitals and medical schools own and occupy are tax exempt.

An additional advantage of locating research facilities off site is the potential for future expansion. For example, MGH's Charlestown Navy Yard Building 149 has an expansion potential in the adjacent Building 199 and on 14 nearby vacant acres now under the control of the B.R.A. Many of Boston's major hospitals by contrast are located in highly developed areas where further on-site expansion is difficult.

Non-profit Research Institutes

Table XV lists five non-profit research institutes in Boston, which together utilize a quarter of a million s.f. of research space. In the next five years, these institutes expect to nearly double with an expansion of 213,000 s.f. While they would prefer to remain in Boston, close to the teaching hospitals, some of the institutes have considered moving out of the city to find suitable space for expansion needs.

The total square footage for all the facilities operated by the five research institutes is 245,916 s.f. and the total employment is 573, for an average space utilization of 429 square feet per employee (Table XV).

The additional space envisioned by the research institutes over the next five years will accommodate upwards of 508 new research jobs at current average

Table XV
Boston Non-Profit Research Institutes,
Employment and Facility Requirements,
1987 and Anticipated by 1992

Non-Profit Research Institutes	1987 Employment	1987 Building Size (sq. ft.)	1987 Sq. Ft. Per Employee	1992 Additional Space in 5 Years	1992 Additional Employment in 5 yrs.
West End Area					
Boston Biomedical	100	53,000	530	53,000	100
Eye Research Foundation	195	74,000	379	130,000	343
West End Sub-Total	295	127,000	431	183,000	443
Longwood Medical Area					
Center for Blood Research	100	55,000	550	0	0
Forsythe Dental Center	117	35,791	306	0	0
Hughes Institute	61	28,125	461	30,000	65
Med. Area Sub-Total	278	118,916	428	30,000	65
Grand-Total	573	245,916	429	213,000	508

Source: B.R.A. Research Dept., Medical Industry Survey, 10.29.87.

space utilization rates (Table XV). This would represent a total growth rate of 89 percent, which averages almost 13 percent annually.

The 1987 combined payroll for these five non-profit research institutes is $19 million for their 573 employees, indicating an average annual salary of $33,159.

Biomedical corporations

There are two types of biotechnology firms in Boston. The first type consists of biomedical research and development corporations. There are five of these corporations in Boston, occupying a total of 51,500 s.f. (Table XVI). Although their number and size are relatively small, these firms anticipate developing an additional 113,000 s.f. in the coming years, more than double the space they currently occupy (Table XVI).

The Boston biotechnical research and development firms have a total work force of 132 employees. The resulting square feet per worker ratio is 390 for the biotech research and development firms in Boston (Table XVI). Future biotech research and development space will accommodate 422 employees, based on each firms current space utilization and requirements.

These five biotech research and development firms have a total payroll of $3.2 million for their 132 employees, which results in an average annual salary of $24,666.

The second type of biotech corporation is the biotechnology support firm. One firm that performs this role in Boston occupies an estimated 27,500 s.f. of office space. This firm employs 125 workers and has no plans for future expansion.

The biotechnical corporations have a total work force in Boston of 257 employees, which is 3.2 percent of the Massachusetts biotech employment of 8,043

Table XVI
Boston Biomedical Firms
Employment & Facility Requirements
1987 and Anticipated by 1992

Type of Biomedical Firms	1987 Employment	1987 Building Size (sq. ft.)	1987 Square Feet/ Employee	1992 Additional Space in 5 Years	1992 Estimated Net Addtn. Employment
Biomedical Research Firms					
Biopure	28	11,500	411	Will build a plant outside of Boston	
Endogen	5	3,000	600	3,000	5
Genzyme*	60	15,000	250	100,000	400
Immonotech	17	10,000	588	10,000	17
Seragen	22	12,000	545	In Spring of 1988, will move to Hopkington, MA.	
Sub-Total	132	51,500	390	113,000	372
Biomedical Support Firm					
Vanderweil Engineering**	125	27,500	220	Expanding in Boston at present time.	
Boston Total	257	79,000	307	113,000	372
Mass.Total***	8,043	2,469,201	307	NA	NA
Boston as a percent of Mass.	3.2	3.2	NA	NA	NA

Sources: List of firms, their employment and Mass. total from: Impact of Health Services And The Biotechnical/Biomedical Industries On The Mass. Economy, Martilla & Kiley, 1987.

A description of each firm's activities, products and services may be found in the Directory of Biomedical and Genetic Engineering Firms, 1987.

Building space, employment and future space requirements reported by company officials to BRA Research Dept., Medical Industry Survey Team, 1987.

Footnotes: *Genzyme may build a plant in Boston or Cambridge to be near MIT. **Vanderweil is an office industry and its size was determined by multiplying the employees by 220 sq ft per employee. ***Mass. total square feet estimated by multiplying an estimated 307 square feet per worker by total employment.

workers. Boston has five of the state's 60 biotech firms which gives Boston an 8.3 percent share of the firms.

The net growth in employment of 372 jobs in Boston's biotech firms results in a total growth rate of 145 percent over the coming five years. When only research and development biotech jobs are included the growth rate doubles to 282 percent. This net growth includes the anticipated loss of 50 jobs in two departing firms.

These are impressive growth rates, but one firm is responsible for 100,000 s.f. or 88 percent of the additional space and 400 of the anticipated jobs. The location for this expansion has not been determined but may be in either Boston or Cambridge so that the firm may be near to MIT (Table XVI).

Cambridge has the highest concentration of biotechnology firms in Massachusetts with 28 firms and 1,767 employees, which represents 30 percent of the biotech companies and 22 percent of the biotech jobs in Massachusetts. Boston and Cambridge together comprise one-fourth of the biotech industry employment and 38 percent of the biotech firms in Massachusetts. The average number of employees at a Boston or Cambridge biotech company was 88, and for the remainder of Massachusetts, excluding Boston and Cambridge, the average employment for a biotech firm was 162 employees. The fact that Boston and Cambridge biotech firms comprise roughly half the size of the firms in the rest of Massachusetts indicates that some firms may start-up in Boston or Cambridge and tend to move out of the Boston-Cambridge area during expansion. This trend was also indicated in the interviews with two Boston firms, Biopure and Seragen, both have plans to expand outside of Boston.

CHAPTER V: INTERVIEWS AND INSIGHTS FROM BOSTON HOSPITAL EXECUTIVES

Major Issues/Concerns In Boston's Health Care Industry

We asked top administrators at all the hospitals we visited what they believe to be the greatest problem that their hospital now faces. Executives at different hospitals voiced many of the same concerns.

Financing system

There is grave concern in the health care industry about the issue of financing. The system of health care financing has been changing rapidly and hospitals are trying to adapt to recent changes, as well as anticipate and prepare for any future changes. The recent imposition of the federal Diagnosis Related Groups (DRG) payment system, which determines how much a hospital will be reimbursed for treating Medicare and Medicaid patients depending upon the diagnosis, has drastically altered the way in which hospitals are compensated for treating Medicare and Medicaid patients. At many hospitals, one result of DRGs has been to decrease the number of inpatients and average length of stays while the number of outpatients has grown along with ambulatory care and one-day surgery. Many hospitals are struggling to maintain their capacity (percentage of beds filled), which has dropped dramatically since the introduction of DRGs.

One Longwood area administrator described the DRG system as basically a good system which attempts to respond to insurance premium increases of 26% last year compared to hospital cost increases of only 8%, but added that it does not make sense to try to solve the problem by fixing only <u>one</u> of its parts. Hospitals which treat a high proportion of Medicare and Medicaid patients are affected most by the changes and one hospital administrator complained of being subject "to the whim and winds of regulatory change and expedience."

The proposed State health care financing bill, House Bill 5968, which would put a cap of 5 1/2 percent on hospital charge increases, is strongly opposed by Boston hospitals, large and small. Many administrators said multi-million dollar deficits would result from the passage of such a cap on charges. According to one administrator, the new bill does not allow hospitals to build into the cost system the cost of the care they have provided. He predicted that clinical services would have to be cut back and that although access would increase, the quality of care provided would decline. Another administrator objected that the situation was becoming overly politicized and that elected officials were "not listening to the vital signs of the health industry." At present, the State Legislature is considering the bill and its outcome is uncertain.

Private teaching hospitals with research departments expressed concern about their ability to finance their teaching and research functions in the future without being able to subsidize them through patient billings. One administrator observed that hospital billings have to cover expenditures for teaching and research somehow since the hospital cannot float bonds to finance them.

Public hospitals face different financial problems. Their most pressing monetary concern is simply a lack of funds. They complained about under-financing, lack of adequate resources and having to serve too large a census area.

Hospitals have reacted in a variety of ways so far to changes in their operating environment. To combat some of the uncertainty caused by rapid changes in methods of financing, a few hospitals have added staff members to interpret and respond to the new regulations. Others have cut back on staff. One hospital was forced to eliminate about 400 positions due to hardships imposed by the system of DRGs and the cap system.

Staffing shortages

Another major problem faced by the city's hospitals is staffing shortages, especially in nursing, but also among technical and clerical staff. The most important reason for the shortages is low pay. This issue is closely connected to the financing issue. Imposition of a 5 1/2 percent cap on hospital charge increases would add to the hospitals' current difficulties in attracting staff by making it harder for them to offer more competitive wages. As a recent editorial in the Boston Globe observed, "The proposed 5 1/2 percent cap on hospital reimbursement would add $90 million to the $5 billion operating costs of the state's 107 general hospitals. But 5 1/2 percent pay raises would cost the hospitals $165 million. And the 50,000 hospital-based nurses, who now earn less than schoolteachers, are not likely to settle for 5 1/2 percent or even twice that much." (Boston Globe, August 31, 1987)

In addition, increased job opportunities for women, who are traditionally employed in these fields, are causing some of the shortages. One administrator stated that the "nursing profession needs to be updated to be a competitive choice for men and women."

Need for space to expand

Another pressing concern for many of the city's hospitals is the need for space to expand. Hospitals located in crowded downtown areas are "strapped for space" and place a high priority on finding space to expand in the immediate area. Some hospitals are trying to alleviate the problem by "building up rather than out." One hospital is considering relocating to a different part of the city because it needs more space and because medical practice "now demands totally new facilities which can only be provided by new buildings."

The need for room to expand and hospitals' ideas on confronting the problem are discussed later in this report, in the section reporting preliminary findings of the survey.

Need for additional parking

Parking is a "horrendous problem" for many city hospitals. The cause is simply a lack of space for any additional parking lots adjacent to or near most hospitals. The Longwood Area hospitals have joined together through the Medical Area Service Corporation (MASCO) to provide a shuttle service between hospitals and parking lots and T stops near the Longwood area. However, the need for more parking space in the Longwood area and elsewhere in the city is an urgent concern for many hospitals.

Additional concerns

Numerous other concerns were expressed by hospital administrators. One administrator said that the hospital's small size made it more vulnerable to competition as well as to changes in financing. Executives at a few other hospitals mentioned their physical building(s) as a source of concern due to either too small size or deteriorated conditions from lack of adequate upkeep. One hospital specializing in long-term care spoke of a need for intermediate care for elderly patients who need more medical attention than they would get in a nursing home but do not need the full-time care provided by a hospital. Another hospital mentioned a need to overcome its image of being a single-specialty hospital since it now provides a variety of services.

Advantages/Disadvantages of being in Boston

We also asked hospital directors and administrators to identify the

particular advantages and problems which were presented to the hospital by its location within the city of Boston. On balance, the advantages of being in the city far outweighed any disadvantages.

Longwood area institutions

Hospitals in the Longwood Medical Area mentioned their proximity to and interaction with the other major hospitals in the immediate area, as well as Harvard Medical School, as being very positive. The Longwood area is a known medical area with a wealth of talent which serves to attract both patients and professionals. One administrator cited the "tremendous resources right here within a six block area" as a strong advantage for the hospital. Another put it more succinctly saying, "the action is here."

Another advantage most Longwood area administrators spoke of as a plus for their location is good access to public transportation. This makes it easier for patients to get to and from the institutions and also provides the hospitals with access to a wider labor pool.

However, Longwood area executives mentioned disadvantages as well as advantages to being located in the city. For example, some administrators cited delays on the Green Line, as well as infrequent Green Line service at times when shifts were changing, as a major problem. One administrator predicted more of the hospital's staff would use the Green line if not for these shortcomings.

A lack of space for parking for staff as well as patients is a huge problem for most of the Longwood institutions. In addition, congestion due to the concentration of institutions in the area is a problem cited by more than one administrator.

Another problem that was mentioned is the cost of housing in metropolitan Boston. One director complained of the difficulty of attracting employees from

other parts of the country where housing is not in such short supply and is therefore much more affordable.

One administrator mentioned past and present racial tensions and the unfavorable national press which Boston once had as making it more difficult to bring in minorities. However, he stated that this is much less of a problem now than it was ten years ago.

Institutions outside of the Longwood area

Other hospitals, spread throughout the city of Boston, mentioned a wide variety of advantages and disadvantages of being in the city. Those institutions which are located in a densely populated commercial or residential environment benefit from easy access by public transportation, close proximity to their patient population base and, in some cases, other hospitals with which they shared referrals.

However, these hospitals share many of the same problems experienced by the Longwood Area institutions due to their locations in congested downtown areas. Most mentioned shortages in parking facilities. Some spoke of being landlocked in a residential area which subjects any expansion or alteration plans to stringent residential zoning requirements. One administrator expressed apprehension about the restrictions community groups would put on them as they unfolded plans to build on their property. Other institutions were completely landlocked and thus had no space to grow.

Aside from concerns about space to expand or restrictions on freedom to develop their own land, hospital administrators mentioned concerns about the competitive labor market in Boston. As one director put it, "Given constraints on our reimbursement and the specialized care we deliver, this can at times place a burden on the hospital's ability to compete for personnel."

Institutions located in less dense or less developed sections of the city benefit from the lack of congestion and do not face the same critical lack of parking space. Some enjoy a beautiful site. Tradeoffs for these institutions involve being in neighborhoods where public perceptions of safety are negative. For some hospitals, this serves as a barrier to recruitment, as well as a deterrent to patients and their families. As one administrator expressed it, they have an "opportunity to increase their exposure but perception of the area is poor." An additional problem for some hospitals is being underserved by public transportation. One hospital in a poorer section of the city with a negative image complained that although the institution was the major employer in the neighborhood, it could not even get the city to repair and maintain the main street leading to their buildings.

Opportunity for Public Sector Cooperation

Another question we directed to hospital directors and administrators was "Where is the greatest opportunity for public sector cooperation with the hospital to help the hospital to fulfill its mission?"

A number of common themes emerged from responses to this question.

Coordinating/Easing the regulatory process

The most widely mentioned suggestion for public sector assistance was for a re-examination of the entire regulatory process affecting institutional expansions or changes. One Longwood area adminstrator complained that they needed a variance every time they did any construction and suggested that there should be one set of guidelines for all the agencies they were required to go through, rather than one set for <u>each</u> agency, as it now stands. The process needs to be better coordinated since it now adds on "months and months to the

project to go through all these agencies."

Another large institution called the regulation process "an incredibly cumbersome system relative to other parts of the country" and suggested streamlining the system to make it easier and quicker. This administrator noted they had had "lots of senior people working on their DoN (Determination of Need) application for months" when their time could have been used more effectively in other areas.

For smaller institutions, the process can be even more burdensome since they do not have the staff needed to handle all the requirements and to deal with the numerous agencies involved.

Mandated resident involvement adds to the burdensome regulatory problem. One administrator pointed out that the DoN application already involves a number of reviews by community groups. Another administrator criticized the new requirements for community participation in institutional planning saying that, "the city sometimes listens to a small but loud group of citizens" to the exclusion of the hospitals' points of view. He stated that the "city needs to understand the physical needs we have" and that whatever the hospital does to the neighborhood, it also does to itself.

One hospital suggested that the public sector work "to somehow improve the relationship between institutions and communities and to keep politics out of developments."

Re-examining health care financing

Some of the suggestions for increased public sector involvement concerned health care financing. A few administrators called for a re-evaluation of the whole payment/reimbursement process. One director described the situation as one in which "there is an insatiable demand for health care which the public sector

is not willing to pay for." Another administrator said the hospitals needed help in fighting legislation designed to put a cap on hospital billing increases.

One Longwood Area administrator envisioned a role for the city in "describing and recognizing and supporting the key economic role of hospitals in the city." This administrator was concerned about a lack of recognition among city officials and among the public about the vital role of the hospitals in providing thousands of jobs and bringing in lots of federal dollars in research grants to Boston.

Another director specifically mentioned the hospital's opposition to the city's objective of taxing non-profit institutions, pointing out the employment provided by hospitals to people living and paying taxes in the city.

Other opportunities for public sector involvement

Our discussions identified several other areas where administrators thought public sector involvement could be useful. These areas ranged from very broad policy issues to narrower concerns.

Many hospitals mentioned finding additional space for expansion and parking as a crucial problem that hospitals and the public sector could work on together.

Some suggestions for public sector involvement focussed on the provision of low-cost housing for employees and working against additional condominium conversions. One institution specializing in treating mental illness called for more public sector participation in fighting negative attitudes about group housing for mental patients and in providing of more housing of that type.

Other general suggestions included improving public transportation, especially on weekends and during the afternoons, establishing an ongoing dialogue between the city and its hospitals, and educating Boston youth in the health care professions.

Suggestions with a somewhat narrower focus included the city setting up a shared storage facility for hospital supplies, providing a training program for nurses and ancillary support, and helping individual institutions with various building permits and specific projects, such as, in one case, a heliport.

APPENDICES

Summary and Survey of Medical Development in Boston 1975-1989

Massachusetts Determination of Need Program

The Impact of Health Maintenance Organizations

Longwood Area Medical Institutions:
Background Information and General Concerns

Exerpts from

Part I and Part VI

of

A Summary and Survey of Development in Boston 1975-1989

John Avault
Mark Johnson

April, 1987

Boston Redevelopment Authority
Policy Development and Research Department

Raymond L. Flynn, Mayor
City of Boston

Stephen Coyle, Director
Boston Redevelopment Authority

Alexander Ganz, Assistant Director
Policy Development and Research Department

Boston Redevelopment Authority
Board of Directors
Robert L. Farrell, Chairman
Joseph J. Walsh, Vice-Chairman
James K. Flaherty, Treasurer
Clarence J. Jones, Asst. Treasurer
Michael J. Donlan, Member
Kane Simonian, Secretary

DEVELOPMENT SUMMARY FOR BOSTON NEIGHBORHOODS
1975-1989

COST (1986 CONSTANT $1,000)

	OFFICE	RETAIL	MEDICAL	EDUCATIONAL	RECREATION & CULTURAL	PARKING & TRANSPORT.	INDUSTRIAL	HOTEL	EXHIBITION	RESIDENTIAL	TOTAL
EAST BOSTON	$28,829	$1,033	$3,992		$8	$111,140	$90,803	$26,067		$92,773	$354,644
CHARLESTOWN	$73,458	$15,857	$22,165	$9,515	$14,308	$17,304	$28,618			$165,979	$347,205
SOUTH BOSTON	$153,937	$4,617			$11,265	$3,137	$95,913		$71,400	$59,692	$399,960
CENTRAL	$2,459,533	$261,283	$211,899	$4,263	$67,414	$157,337	$28,520	$185,576		$324,636	$3,700,460
BACK BAY-BEACON HI	$646,533	$111,858		$11,447	$5,270	$37,618	$701	$425,009	$102,653	$135,542	$1,476,631
SOUTH END	$13,950	$2,529	$38,378	$6,758	$5,674	$19,704	$49,551	$15,000		$168,579	$320,123
FENWAY-KENMORE	$13,148	$21,216	$342,654	$83,777	$55,360	$50,406	$456,914	$5,000		$179,194	$1,207,668
ALLSTON-BRIGHTON	$19,246	$14,439	$34,109	$205,535		$6,485	$5,117	$20,539		$134,902	$440,372
JAMAICA PLAIN	$1,350	$2,724	$111,735	$390	$460	$707	$4,281			$204,772	$326,420
ROXBURY	$7,142	$6,307	$280	$661	$25,705	$773	$25,958			$148,229	$215,056
N. DORCHESTER	$34,487	$4,895	$325	$17,481	$24,477	$8,067			$15,649	$102,693	$208,073
S. DORCHESTER	$4,794	$2,670		$900	$1,291	$3,036	$8,990	$1,980		$62,886	$86,547
MATTAPAN		$1,085		$2,204			$774			$53,409	$57,472
ROSLINDALE		$480	$628				$80			$29,170	$30,358
WEST ROXBURY	$1,123	$13,119	$42,596			$280				$51,256	$108,374
HYDE PARK	$1,108	$4,868			$295	$353	$6,899			$37,917	$51,441
TOTALS	$3,458,638	$468,980	$808,761	$342,931	$211,525	$416,348	$803,119	$679,171	$189,702	$1,951,629	$9,330,804

PREPARED BY B.R.A. RESEARCH DEPT.
THESE ARE ESTIMATED CONSTRUCTION COSTS. TOTAL DEVELOPMENT COSTS WOULD BE GREATER BY THE AMOUNT OF "SOFT" AND ACQUISITION COSTS.

ACTUAL AMOUNTS [illegible] BE GREATER THAN INDICATED BY THIS TABLE DUE TO THE OMISSION OF . . COST AND SIZE DATA WITHIN THE LIST.
ROWS AND COLUMNS MAY NOT ADD EXACTLY TO TOTALS DUE TO ROUNDING.

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Development List

Readers' Guide

The Development List is a BRA Research Department data base that consists of 1872 entries of major development projects within Boston to be completed between 1975 and 1990. The development list consists of 17 types of information for each project and eight additional fields of information for residential projects. The following chart summarizes the 25 fields of information contained in the development list:

1.) Year of Completion - The year of completion is mainly 1975 to 1990.

2.) Development Type - There are ten development types as follows:

1. Office
2. Retail
3. Medical
4. Educational
5. Cultural and Recreational
6. Parking and Transportation
7. Industrial
8. Hotel
9. Exhibition
10. Residential

3.) Number of Multicomponents - The "M" designates that a project has more than one component. The number that follows the "M" is the number of components and also the number of entries in the development list for that project. The size, cost, and completion date of multicomponent projects are reported separately for each component part.

4.) Rehab. Code - There are seven possible rehab codes that classify each project.

1. New
2. Renov - Renovation
3. Renov # - Historic Renovation
4. Reuse - Adaptive Reuse
5. Reuse # - Historic Adaptive Reuse
6. Reocc - Reoccupation
7. Reocc # - Historic Reoccupation

Renovations describe the rehabilitation of a building that does not change its use or size.

Historic projects are officially certified and are eligible for federal tax credits.

Adaptive reuse is a rehabilitation in which there is a change in use or in the number of dwelling units.

Reoccupations are the reclaimation of previously abandonded buildings.

5.) Status - There are five possible status codes for each project. They are defined as follows:

Complete - The building is ready for occupancy.

Underway - Building permit is granted or building is under construction.

Review - Building permit applied for and under review by inspectional services for building and zoning code compliance, or permit rejected and appealed to zoning board of appeals, or under BRA design review.

Planning - Tentative designation where appropriate or dialogue between developer and city/community - includes design review before permit application.

Proposed - Requests for proposals for public projects or concept proposed by developer and no formal discussions yet with city agencies.

6.) Project Name - Name of the building or project which is sometimes its address.

7.) Address - Location of project.

8.) Construction Cost - Hard construction cost of a project in current dollars.

9.) Total Development Cost - Total cost of all components of a project in current dollars.

10.) Size - The measure of size for a project in standard or non-standard units whichever is available.

11.) Units - The type of unit for each type of development can be either standard or non-standard.

Development Type	Standard Size	Non-standard Size
Office	Square Feet	Floors
Retail	Square Feet	Stores
Medical	Square Feet	Beds
Educational	Square Feet	Beds (dormitories)
Cultural and Rec.	Square Feet	Slips (marina)
Parking and Trans.	Cars	Bays (repair garages)
Industrial	Square Feet	Floors
Hotel	Rooms	Floors
Exhibition	Square Feet	--
Residential	Dwelling Units	Rooms (lodging house)

All square footage is measured on a net leasable basis. Only standard size units are reported in the summary tables in Part I of the overall report.

12.) Tax Status - There are seven possible status codes with respect to the Boston Property Tax.

1. 121A - Urban Renewal Program Tax agreement.
2. Exempt - Tax exempt.
3. PILOT - Payment In Lieu Of Tax
4. Agree - Exempt property agreement without payment.
5. Lease - Lease of city or BRA property. Often land is leased and building is taxed.
6. Tax - Taxable
7. Mixed - A combination of the above.

13.) Planning District - There are 16 BRA planning districts in Boston.

1. East Boston
2. Charlestown
3. South Boston
4. Central
5. Back Bay-Beacon Hill
6. South End
7. Fenway-Kenmore
8. Allston-Brighton
9. Jamaica Plain
10. Roxbury
11. North Dorchester
12. South Dorchester
13. Mattapan
14. Roslindale
15. West Roxbury
16. Hyde Park

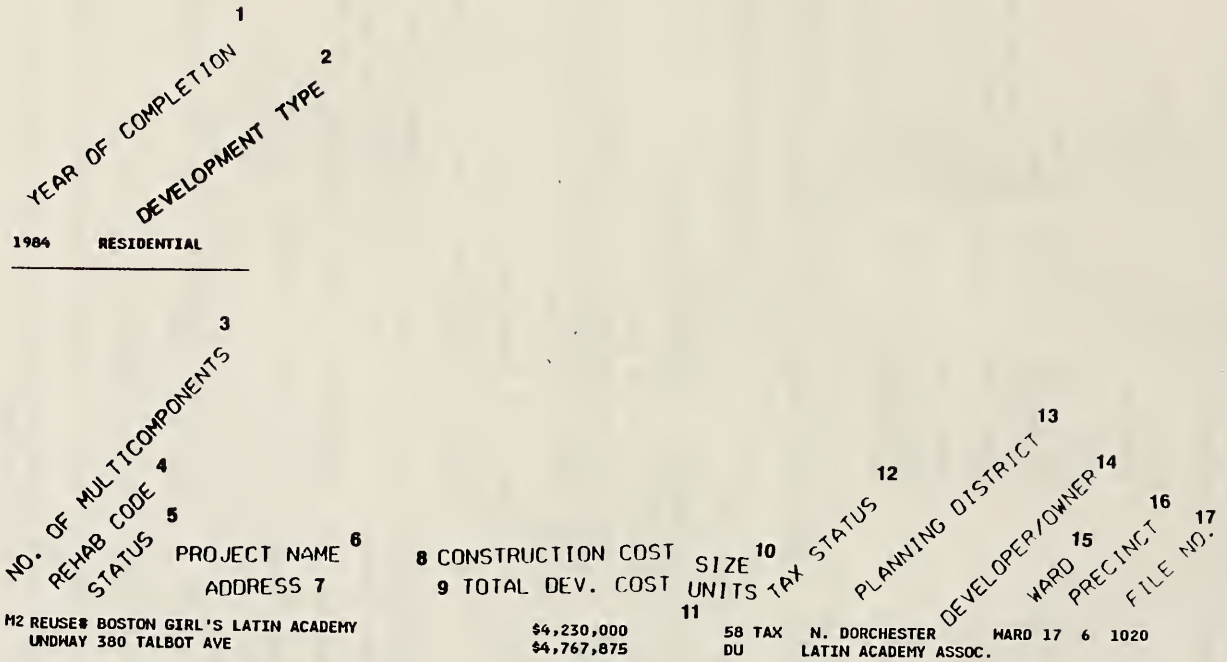
14.) Developer/Owner - The person that applies for the building permit usually either the developer or owner.

15.) Ward - There are 22 wards in Boston.

16.) Precinct - There are between 7 and 23 precincts within each ward.

17.) File Number - This is the BRA Policy Development and Research Department computer file number.

DEVELOPMENT LIST READERS GUIDE



MEDICAL DEVELOPMENT LIST

76 NEW	BETH ISRAEL FELOBERG BUILDING MEDICAL AREA	$12,000,000	176,490 SQ FT	EXMPT	FENWAY-KENMORE	HARD	4 10	34
76 NEW	MASSACHUSETTS EYE & EAR PHASE II WEST END	$7,000,000	133,610 SQ FT	EXMPT	CENTRAL	HARD	3 5	35
76 NEW	DEACONESS,KENNEDY BUILDING MEDICAL AREA	$4,500,000	78,500 SQ FT	EXMPT	FENWAY-KENMORE	HARD	4 10	36
76 NEW	FAULKNER HOSPITAL 1153 CENTRE STREET	$44,000,000	423,030 SQ FT	EXMPT	JAMAICA PLAIN	HARD	19 2	37
76 NEW	EAST BOSTON HEALTH CENTER 10 GOVE STREET	$2,200,000	30,000 SQ FT	EXMPT	EAST BOSTON	HARD	1 4	38
78 RENOV	HARVARD COMMUNITY HEALTH PLAN ONE FENWAY PLAZA	$11,000,000	432,000 SQ FT	PILOT	FENWAY-KENMORE	HARD	21 1	90
78 NEW	SIDNEY FARBER CANCER INSTITUTE 44 BINNEY STREET	$34,000,000	400,000 SQ FT	EXMPT	FENWAY-KENMORE	HARD	4 10	91
80 NEW	BRIGHAM & WOMEN'S HOSPITAL CENTER & LAB MEDICAL AREA	$60,000,000	800,000 SQ FT	EXMPT	FENWAY-KENMORE	HARD	4 10	179
80 NEW	MATERIALS HANDLING CENTER (SERVICENTER) MEDICAL AREA	$10,000,000	60,500 SQ FT	121A	FENWAY-KENMORE	HARD	4 10	180
81 NEW	MASS. GENERAL AMBULATORY CARE CENTER WEST END	$25,000,000	287,000 SQ FT	PILOT	CENTRAL	HARD	3 5	246
82 NEW	N.E. MEDICAL CENTER PEDIATRIC HOSPITAL	$33,000,000	150,000 SQ FT	PILOT	CENTRAL	HARD	3 8	345
82 NEW	TUFTS NUTRITION CENTER WASHINGTON,STUART STREETS	$21,000,000	214,000 SQ FT	EXMPT	CENTRAL	HARD	3 8	346
82 NEW	MASS. REHAB HOSPITAL ADDITION NORTH STATION	$3,500,000	32,096 SQ FT	TAX	CENTRAL	HARD	3 5	347
82 RENOV	N.E. MEDICAL CENTER, SHUFFLE SPACE PRATT, FARNSWORTH, PRAGER	$15,000,000	28 BEDS	EXMPT	FENWAY-KENMORE	HARD	4	348
83 NEW	BRIGHAM & WOMEN'S HOSP. RESEARCH BUILDING MEDICAL AREA	$30,000,000	172,000 SQ FT	PILOT	FENWAY-KENMORE	HARD	4 10	458
83 NEW	NORTH END COMM. HEALTH CENTER NURSING FULTON & RICHMOND STREETS/NORTH END	$6,600,000	69,000 SQ FT	PILOT	CENTRAL	HARD	3 1	459
83 NEW	BRIGHAM & WOMENS HOSP. AMBULATORY SERVICE MEDICAL AREA	$14,500,000	98,000 SQ FT	PILOT	FENWAY-KENMORE	HARD	4 10	460
83 RENOV	N.E. MEDICAL CENTER BINEND BUILDING	$16,800,000	70,000 SQ FT	PILOT	CENTRAL	HARD	3 8	461

83 REUSE COMPLT	MEDICAL BUILDING THOMPSON SQUARE	$150,000	17,000 SQ FT	TAX	CHARLESTOWN	HARD	2	1	462
83 RENOV M4	ST. ELIZABETH'S HOSPITAL (PHASE I) 736 CAMBRIDGE STREET	$4,000,000		EXMPT	ALLSTON-BRIGHTON	HARD	21	9	463
84 NEW COMPLT	A.M. SACKLER CENTER FOR HEALTH COMMUNICAT 145 HARRISON AVE & HARVARD ST.	$11,669,000 $23,000,000	134,875 SQ FT	EXMPT	CENTRAL TUFTS UNIVERSITY	HARD	3	8	622
84 RENOV	NEW ENGLAND BAPTIST HOSPITAL PARKER HILL AVENUE/MISSION HILL	$30,000,000	150,000 SQ FT	EXMPT	JAMAICA PLAIN	HARD	10	5	623
84 NEW COMPLT	M.G.H. WELLMAN RESEARCH BUILDING WEST END	$15,000,000	100,000 SQ FT	PILOT	CENTRAL	HARD	3	5	624
84 NEW COMPLT	SULLIVAN'S PHARMACY-ROSLINDALE SQUARE 1-9 CORNITH ST.	$592,000	6,500 SQ FT	TAX	ROSLINDALE LAHAM TRUST	HARD	20		625
84 REUSE	FORMER BOSTON EDISON STATION CAMBRIDGE & CHARLES STS./MASS. EYE & EAR	$2,000,000	33,663 SQ FT	TAX	CENTRAL	HARD	3	6	626
85 NEW M3	LONGWOOD MEDICAL OFFICE BUILDING 333 LONGWOOD AVE & BINNEY ST.	$4,500,000 $12,700,000	61,600 SQ FT	TAX	FENWAY-KENMORE TRSTS LONGWOOD MED BLDG	HARD	4	10	758
85 NEW M4	ST. ELIZABETH'S HOSP. NORTH COMP.(PH.II) 736 CAMBRIDGE STREET	$20,000,000	150,000 SQ FT	EXMPT	ALLSTON-BRIGHTON	HARD	21	9	759
85 RENOV M4	ST. ELIZABETH CARDINAL CUSHING PAVIL.(III 736 CAMBRIDGE STREET	$6,000,000		EXMPT	ALLSTON-BRIGHTON	HARD	21	9	760
85 NEW COMPLT	291 INDEPENDENCE AVE HEALTH CLINIC	$4,475,000	3 STORY	TAX	WEST ROXBURY HARVARD COMMUNITY HEALTH PLAN	HARD	20	20	761
85 NEW UNDWAY	SOUTH COVE MANOR NURSING HOME 120 SHAWMUT AVE-HERALD & BERKLEY STS.	$2,900,000 $3,500,000	100 BEDS	EXMPT	SOUTH END SOUTH COVE NURSING FOUNDATION	HARD	3	8	762
86 NEW M4	ST. ELIZABETH'S HOSPITAL (PHASE IV) 736 CAMBRIDGE STREET	$2,000,000		EXMPT	ALLSTON-BRIGHTON	HARD	21	9	964
87 NEW UNDWAY	CHILDRENS HOSPITAL MED. CENTER 17-25 BLACKFAN AVE-MEDICAL AREA	$49,000,000 $69,500,000	349 BEDS	EXMPT	FENWAY-KENMORE CHILDRENS HOSPITAL MEDICAL CENTER	HARD	4	10	1203
87 NEW REVIEW	UNIVERSITY HOSPITAL RECONSTRUCTION 88 EAST NEWTON	$35,400,000 $66,000,000	6 STORY	PILOT	SOUTH END UNIVERSITY HOSPITAL	HARD	8	2	1204
87 RENOV REVIEW	N.E. MED CENTER 10-14 NASSAU ST	$220,000	1 STORY	PILOT	CENTRAL N.E. MED CENTER	HARD	3		1205
87 NEW M2 UNDWAY	MEDICAL BLDG-PARKING GARAGE 320 WASHINGTON ST	$1,000,000 $1,264,000	3 STORY	TAX	ALLSTON-BRIGHTON	HARD	22	3	1206
87 REUSE& M3 UNDWAY	MASS GENERAL HOSP. RESEARCH & ADMIN. CHARLESTOWN NAVY YARD BLDG #149	$22,000,000 $48,000,000	325,000 SQ FT	MIXED	CHARLESTOWN CONGRESS DEV CORP	HARD	2	2	1207

87 NEW REVIEW	HEALTH CLINIC 250 MT VERNON	$325,000		TAX	N. DORCHESTER HARBOR POINT APTS CO	HARD	12	3	1208
87 NEW	NEW ENGLAND MED. CENTER PEDIATRIC PSYCH.	$975,000	10 BEDS	PILOT	CENTRAL	HARD	3	8	1209
87 NEW M2 UNDWAY	BRIGHAM & WOMENS HOSP.-AMBULATORY II 75 FRANCIS STREET	$11,305,000 $13,337,000	88,000 SQ FT	PILOT	FENWAY-KENMORE BRIGHAM & WOMENS HOSPITAL	HARD	4	10	1210
87 NEW UNDWAY	M.G.H. BARTLETT HALL ADDITION WEST END	$4,500,000	26,000 SQ FT	PILOT	CENTRAL	HARD	3	5	1211
87 REUSE UNDWAY	ALCOHOL RECOVERY HOME FROM APTS. 279 & 291 EUSTIS ST	$280,000	25 BEDS	TAX	ROXBURY B.R.A.	HARD	8	7	1212
87 REUSE UNDWAY	HOSPITAL REUSE(FORMER HOUSING) 76-80 PARKER HILL AVE.	$24,500	3 FLOORS	EXMPT	JAMAICA PLAIN N.E.BAPTIST HOSP.	HARD	10	4	1213
87 REUSE UNDWAY	HOSPITAL USE(FORMER 3 FAM. & COMM.CENTER) 116-118 PARKER HILL AVE.	$31,700	5 FLOORS	EXMPT	JAMAICA PLAIN N.E.BAPTIST HOPSITAL	HARD	10	4	1214
88 RENOV M2 UNDWAY	ORTHODONTIST OFFICE 328 NEWBURY STREET		3,000 SQ FT	TAX	BACK BAY-BEACON HI NEW KORN RLTY-GAIL KORN	HARD	5	3	1506
88 NEW REVIEW	SPAULDING REHAB HOSP. 125 NASHUA ST		2 STORY	EXMPT	CENTRAL SPAULDING REHAB HOSP.	HARD	3	5	1507
88 NEW UNDWAY	DANA FARBER CANCER-RESEARCH 440 BROOKLINE AVE	$12,300,000 $24,000,000	100,000 SQ FT	PILOT	FENWAY-KENMORE DANA FARBER CANCER INST.	HARD	4	10	1508
88 NEW UNDWAY	V.A. HOSPITAL EXPANSION VFW PKWY AT SPRING STREET	$38,000,000 $45,000,000	150,000 S.F.	EXMPT	WEST ROXBURY VETERNS ADMINISTRATION	HARD	20	5	1509
89 NEW M2 REVIEW	STONEMAN BLDG-BETH ISREAL HOSP. 330 BROOKLINE AVE	$3,580,000	3 STORY	PILOT	FENWAY-KENMORE BETH ISREAL HOSP ASSOC	HARD	4	10	1760
89 RENOV M2 UNDWAY	STONEMAN BLDG-BETH ISREAL HOSP. 330 BROOKLINE AVE	$800,000	2 STORY	EXMPT	FENWAY-KENMORE BETH ISREAL HOSP ASSOC	HARD	4	10	1761
89 NEW PROPSD	N E DEACONESS HOSP REPLACEMENT LONGHOOD MED AREA-MED		250,000 SQ FT	EXMPT	FENWAY-KENMORE N.E. DEACONESS TRUSTEES	HARD	4	10	1762
89 NEW M4 PROPSD	MASS GEN HOSP.-PHASE I INPATIENT BED REPLACEMENT	$41,000,000 $180,000,000	133 BEDS	PILOT	CENTRAL MASS GENERAL	HARD	3	5	1763
81 NEW	MEDICAL AREA TOTAL ENERGY PLANT MEDICAL AREA	$372,000,000		121A	FENWAY-KENMORE	HARD	4	10	252

DETERMINATION OF NEED PROGRAM

The Determination of Need (DoN) program operates within the Massachusetts Department of Public Health, in the Executive Office of Human Services. It was established in 1972 to review substantial expenditures by health care facilities. It currently reviews expenditures related to patient care which involve capital costs in excess of $600,000 and operating costs of $250,000 and over. There is an exemption for expenditures for research as long as it is primarily clinical and not involved with patient care. With a research exemption, the health care facility has to notify DoN but is not required to fill out an application or gain approval for the expenditure.

Projects requiring approval fall into five categories - development or expansion of services, innovative/specialty technology, replacement of pre-existing equipment, plant renovation/replacement, and miscellaneous.

DoN's six major objectives are: (1) reducing overall health care costs by preventing duplication of services; (2) ensuring promotion of the higher priority health care needs of the public; (3) promoting equitable geographic and socioeconomic access to health care; (4) encouraging public participation in review of proposals; (5) improving internal hospital planning; (6) advancing standards of quality health care.

In fiscal year 1986, DoN received 175 applications with $785,608,377 in capital expenditures, which was the highest filing in the fifteen years that DoN has been in existence. The table below illustrates the number of projects processed by DoN over a three year period from 1984 to 1986 for the greater Boston area and for the State of Massachusetts. Boston's share of the Massachusetts total is shown in parentheses.

DoN Applications and Approved Expenditures

	Massachusetts	Greater Boston
1984	134 projects $282.7 mil. approved	48 projects (35.8%) $178 mil. approved (63%)
1985	178 projects $232.3 mil. approved	74 projects (41.6%) $98.8 mil. approved (42.5%)
1986	163 projects $622 mil. approved	64 projects (39.3%) $489.8 mil. approved (78.7%)

In 1986, the majority of projects acted upon in Massachusetts (53%) arose from hospitals. Forty six applications (28%) were from clinics and other facilities, and 19% were from nursing homes and other adult care facilities.

In contrast to the growth in expenditures over the last few years (from $282.7 million in 1984 to $622 million in 1986), the percentage of projects approved by DoN has declined dramatically over the last five years. In 1981, 93% of all projects were approved. By 1986, that figure had dropped to 52%, with only 48% of projects from the greater Boston area approved.

The chart below outlines the sharp decline in the D.O.N. approval rate.

Year	% Approved
1981	93%
1982	89
1983	65
1984	56
1985	65
1986	52

The application requires detailed information about the components and objectives of the project, and its congruence with regional and local goals. Also required is information concerning costs, the proposed means of financing, and the projected benefits to the community's medically indigent population. Applications must also include a description of the hospital's planning process, any alternative proposals considered and the project's consistency with established health care guidelines.

THE IMPACT OF HEALTH MAINTENANCE ORGANIZATIONS

One of the biggest changes in the health care industry throughout the United States in recent years has been the emergence and rapid growth of Health Maintenance Organizations (HMOs). In the greater Boston area, HMOs are also altering the health services field.

There are several different types of HMOs providing contracted health services to members -- Group, Staff, Network and Independent Practice Associations (IPAs). Doctors can be affiliated with more than one HMO. In addition, hospitals may have contractual arrangements with several HMOs.

Growth in HMO Membership

Membership in federally qualified HMOs in the greater Boston area increased over 300% between June, 1980 and December, 1984. In 1985 and 1986, annual growth in membership enrollment was about 20%. One of the plans expanding most rapidly is Harvard Community Health Plan (HCHP) which experienced a 45% increase in membership between December, 1985 and December, 1986 during which time it merged with Multigroup Health Plan in Wellesley. (See table) HCHP, formed in 1970, is the oldest and also the largest HMO in the Boston area with over 300,000 enrollees. Bay State Health Care (over 175,000 members) and Tufts Associated Health Plan (over 80,000 members) have also expanded greatly in recent years, with growth rates of about 36% and 40% between the end of 1985 and the end of 1986.

Overall membership in Boston area HMOs increased from approximately 140,000 in 1980 to over 800,000 by 1986. Over the same period, the number of HMOs serving the Boston area population has almost tripled, from five to at least 14.

Types of Services/Care Provided by HMOs

One of the unique aspects of HMOs is their emphasis on preventative care rather than simply treatment of existing ailments. Some of the hospitals interviewed predicted that admissions might decline somewhat in the future as preventative care reduces the number of people needing hospital treatment. However, HMOs do not yet appear to be having a noticeable impact on the number of patients admitted or types of illnesses treated.

Types of care not provided by most HMOs include long-term care and psychiatric care. Referrals from HMOs to hospitals specializing in acute care and mental illness have increased over the past decade corresponding to the growth of HMOs.

Impact on the Health Services Industry

In order to respond to the changing environment and maintain their market share, many hospitals in Boston have adapted to the growing importance of HMOs in the health care field by forming contractual arrangements, usually with several HMOs.

HMO ENROLLMENT AND UTILIZATION, 1980 to 1986 -- GREATER BOSTON AREA

	MEMBERSHIP/ENROLLMENT									
PLAN NAME	6/80	12/84	% Change 6/80-12/84	12/85	% Change 12/84-12/85	12/86	% Change 12/85-12/86	% of Enrollees in each plan	Date Formed	Type of Plan
Bay State Health Care (Boston)	7622	97500	1179.2%	130162	33.5%	176470	35.6%	21.1%	1979	IPA
Fallon Community Health Plan (Worcester)	24327	59633	145.1%	66201	11.0%	73553	11.1%	8.8%	1977	GROUP
Family Health Plan of Mass. (Framingham)		19033		25038	31.6%	26910	7.5%	3.2%	1982	IPA
Harvard Community Health Plan (Boston)	92384	184031	99.2%	210131	14.2%	305541	45.4%	36.5%	1970	STAFF
Harvard Univ. Group Health Plan (Cambridge)	4628	6293	36.0%	6100	-3.1%	6306	3.4%	0.8%	1973	STAFF
Healthway Medical Plan (Brockton)	1435	32600	2171.8%	37011	13.5%	40000	8.1%	4.8%	1980	GROUP
Lahey Clinic-BC/BS HMP (Burlington)		24164		28406	17.6%	31000	9.1%	3.7%	1981	GROUP
Medical East Health Plan (Chicopee)		16161				30520		3.6%	1983	STAFF
MIT Health Plan (Cambridge)	7495	8532	13.8%	8692	1.9%	8373	-3.7%	1.0%	1974	STAFF
Multigroup Health Plan (Now HCHP) (Wellesley)		48588		64754	33.3%	0			1981	NETWORK
North Shore Health Plan (Peabody)				2728		5152	88.9%	0.6%		
Pilgrim Health Care, Inc. (Middleboro/Norwell)		33344		41941	25.8%	55000	31.1%	6.6%	1981	IPA
Tufts Associated Health Plan (Waltham)		34200		56917	66.4%	79390	39.5%	9.5%	1982	IPA
West Suburban Health Care Plan (Lexington)		7500		7488	-0.2%	NA			1981	IPA
TOTAL MEMBERSHIP	137891	571579	314.5%	685569	19.9%	838215	22.3%	100.0%		

Sources: U.S. Department of Health and Human Services - National HMO Census of Prepaid Plans, 1980
InterStudy - National HMO Census 1985, (December, 1984; June 1985; December, 1985)
The InterStudy Edge: Quarterly Report of HMO Growth and Enrollment as of December 31, 1987

LONGWOOD AREA MEDICAL INSTITUTIONS:
BACKGROUND INFORMATION AND GENERAL CONCERNS

On July 2, 1987, a meeting was held between three representatives of the Medical Area Services Corporation (MASCO), which serves hospitals and other health care institutions in the Longwood Area, and members of the BRA Research Department's Medical Industry Survey Team.

The information gained from MASCO concerning Longwood Medical Area institutions is outlined below:

The Longwood Medical Area covers 175 acres with 13 million square feet of floor space (1 million square feet is under construction at present). There are 14 institutions under the MASCO umbrella, providing approximately 2100 beds.

There is tremendous pressure for space for construction and parking facilities. Current use of floor space is estimated at about 45% patient care, 25% research, 15% teaching. They found it difficult to predict beyond 5 years but a number of trends were apparent:

1) The influence of Diagnosis Related Groups (DRGs) is leading to shorter stays in hospital and to replacement of in-patient surgery with day-surgery. This is leading to increasing problems of transporting patients and staff into and out of hospitals.

2) There is a move to sharing of resources, e.g. potential for Beth Israel, Brigham and Women's, and Children's Hospitals to share facilities such as an NMR scanner or Lithotripter.

3) With regard to space demands, it is predicted that there will be increases in requirements for:

a) computer space
b) warehousing
c) research

Computer space and warehousing could easily be moved off-site. Research could be either on or off-site but patient care and teaching would obviously have to remain on-site.

The sharing of new research facilities may pose problems as researchers may to some extent be in competition with one another. This may make it difficult to rent, as a group, a single building for research purposes. Any new off-site facilities that are acquired will need to have good access and transportation.

MASCO Administrators identified several of the problems they feel hospitals are now facing. These include lack of convenient housing, transportation and parking spaces. All these problems arise out of a basic lack of space. Such difficulties with housing and transportation are leading to difficulties in keeping staff and a subsequent need to raise salaries. They would therefore like to see the BRA helping in these areas of improving housing and transportation.